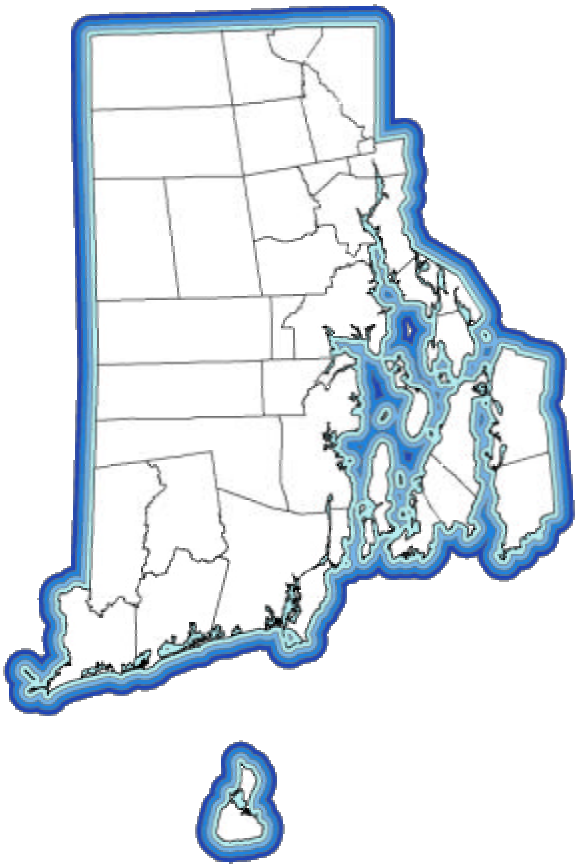
RHODE ISLAND DEPARTMENT OF HEALTH

Cancer

In Rhode Island



Donald L. Carcieri, Governor
Patricia A. Nolan, MD, MPH, Director
August, 2003; Updated February, 2004

State of Rhode Island
Department of Health
www.health.ri.gov

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STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

DEPARTMENT OF HEALTH

Patricia A. Nolan, MD, MPH
Director

Donald L. Carcieri
Governor

August 2003

Dear Rhode Islanders,

It is with great pleasure that I present to you *Cancer in Rhode Island*, a summary of reports on Rhode Island's cancer burden, from trends in cancer rates to the progress in prevention, screening, and treatment. I sincerely hope that *Cancer in Rhode Island* proves useful to our community partners as they field new programs to control the consequences of cancer in our state.

I would like to thank all those who contributed to *Cancer in Rhode Island*, most especially Leanne C. Chiaverini and John P. Fulton of the Department of Health, Dottie Darcy of the Hospital Association of RI, and Erin O. Smith, Public Health Foundation Intern, for their extensive contributions to this report.

The Rhode Island Department of Health is firmly committed to maintaining and enhancing its cancer surveillance system, convinced that successful prevention and control efforts are founded on complete, accurate, and timely data. In this vein, we plan to revise *Cancer in Rhode Island* annually. We hope you find this first edition to be useful and provocative.

Sincerely,

Patricia A. Nolan, MD, MPH
Director

ACKNOWLEDGEMENTS

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INTRODUCTION TO CANCER

Definition of Cancer

Cancer, an abnormal growth of cells anywhere in the body, is often described as a group of more than 100 different diseases that have similar characteristics. Cancer occurs when genes in a cell allow it to become abnormal, and divide and grow uncontrollably. Cell division is normal, but when this process is uncontrolled, a mass of tissue (called a growth or tumor) forms.

Malignant tumors are cancerous and can spread widely to other parts of the body by entering the bloodstream or lymphatic system as well as harming nearby tissues and organs. (NCI cervix) The spread of cancer is called metastasis. Metastasis is dangerous because the farther a cancer spreads, the harder it is to control, and because a number of vital organs may be harmed at once. Benign tumors are not "cancer" and do not spread widely throughout the body, although they can grow substantially and damage surrounding tissues if not treated.

Cancer Sites

There are many kinds of cancer, because there are many kinds of cells in the body. Cancers are named for the part of the body (primary site) in which they begin. Cells that spread to another part of the body have the same kind of abnormal cells and the same name as the original cancer. (NCI cervix)

Causes of Cancer

Many things cause cancer by affecting the genes that control cell growth. Each type of cancer is caused by different factors related to lifestyle, environment, and heredity. Some factors are well established, while others are uncertain or unknown. The most common causes of cancer in Rhode Island are tobacco, unbalanced diets, and too much sunlight. We can control many causes of cancer by making good choices in our everyday lives.

Stage of Disease

Stage describes the extent that the cancer has spread. Determining the stage of the cancer helps inform treatment decisions and outlook for recovery.

Risk Factors

A risk factor for cancer is anything that increases a person's chance of developing cancer. Some risk factors are non-modifiable such as genetics and family history of cancer. It is believed that there is some genetic component to all cancers. However, as research progresses, specific genetic markers for individual cancers are becoming clearer. Other risk factors are associated with lifestyle, such as tobacco use, diet, lack of exercise, alcohol use, exposure to ultraviolet radiation, and certain sexually transmitted diseases. Several risk factors can act together to increase the risk of cancer. When cancer is caused by a particular exposure, the cancer may not develop for a long period of time. The time between exposure and diagnosis of cancer is called the latency period. (Vermont)

CANCER CONTROL STRATEGIES

The goal of cancer control is to reduce burden, illness, and death from cancer. Strategies proven to be helpful in reaching this goal are: monitoring the burden of cancer **(surveillance)**; avoiding known external (non-genetic) causes of cancer **(prevention)**; identifying tumors at early stages of development, when treatment is more likely to effect a long-term, disease-free state **(screening)**; using state-of-the-art cancer therapies **(treatment)** to control or cure the disease; and assuring effective pain control and other supportive measures **(palliative care)** for those patients who will eventually die of their disease, including supportive services for family care givers. Because different types of cancer vary in the extent to which they may be controlled by prevention, screening, and treatment, comprehensive cancer control embraces all approaches.

Surveillance

Cancer registries at the local, state, and national level collect and analyze data on the diagnosis, stage of disease, treatment, and demographics of cancer patients. (Vermont, HP) Cancer surveillance, the systematic collection, analysis, and interpretation of cancer data, provides the foundation for cancer control. It is an indispensable tool that enables public health professionals to better understand and tackle the cancer burden while advancing clinical, epidemiologic, and health services research. (HP) Surveillance data are "essential for planning and evaluating cancer control programs, allocating preventive and treatment resources, targeting and conducting research, and responding to concerns from citizens about the occurrence of cancer in their communities." (HP)

Prevention

Many cancer deaths could be prevented through lifestyle changes. Some common cancers, such as cancers of the lung, colon-rectum, oral cavity, skin, and cervix are largely preventable by avoiding certain risk factors, such as tobacco use, fatty diet, sedentary lifestyle, chronic alcohol use, exposure to ultraviolet radiation (sunlight), and certain sexually transmitted diseases. More than 180,000 tobacco-related cancer deaths (estimated in 2003) and another estimated 180,000 cancer deaths related to nutrition, physical inactivity, obesity and other lifestyle factors could be prevented through behavioral changes. (ACS Facts 2003)

Screening

Screening involves checking for cancer or cancerous conditions in asymptomatic persons. This is important because screening for some cancers is effective in detecting precancerous cells or finding cancer at an early stage when treatment is more effective. Screening procedures vary for different cancers, and may involve a physical exam, a laboratory test, or procedures such as mammography or colonoscopy that look at an internal organ. (Vermont)

Cancers of certain anatomical sites, accounting for about half of all new cases, may be detected with screening tests. (ACS Facts 2003) Many malignancies of the colon-rectum, female breast, and cervix may be detected and treated early enough to effect a long-term disease-free state, and screening tests for cancers of the prostate, skin, and oral cavity are used inconsistently as their effectiveness is still under debate. The effectiveness of mass screenings for cancers of other sites has not been fully evaluated.

In general, screening works if the disease has a relatively long period of development during which it is susceptible to treatment, if the screening test has high sensitivity and specificity (the ability of the test to identify a high proportion of true positives and true negatives, while avoiding false positives and false negatives), and if the available treatment is effective. If any one of these three elements is missing, screening may not help control the disease.

Treatment

The use of different methods of treatment for cancer, such as surgery, hormone therapy, radiation, chemotherapy, and biologic therapy, is based on a number of factors, including the type of cancer, the stage of the cancer, and the patient's age and general health. (ACS Guide)

The effectiveness of treatment for many types of cancer has advanced significantly over the past two decades. Nonetheless, many cancer patients do not receive state-of-the-art treatment. Were they to do so, it is estimated that the mortality rate from all cancers combined would be reduced about one-fourth. Improving access to state-of-the-art cancer treatment includes interventions for clinical trials, American College of Surgeons (ACOS) approved hospital cancer programs, and American Joint Committee on Cancer (AJCC) staging methodology.

Palliative Care

The goal of palliative care is to relieve suffering and improve quality of life for patients with advanced illness. (Center) Many terminally ill cancer patients in this country still do not receive adequate palliative care. As a result, many experience very poor quality of life at the end of life. Many live and die in pain.

Hospice represents a proven, systematic approach to the provision of palliative care which has been successful in overcoming many existing barriers to effective palliation, especially with regard to the control of cancer pain. Hospice provides a compassionate, team-oriented approach to expert medical care, pain management, and emotional and spiritual support tailored to the needs and wishes of the patient. (Palliative) Unfortunately, only about 40% of terminally ill cancer patients receive hospice care, and many receive it only in the last few weeks of life, after enduring the side effects of misdirected curative treatment and uncontrolled pain.

ABOUT THE DATA

Statistical Terms

Incidence, prevalence, mortality, and lifetime risk are common statistics used to assess the burden of cancer in RI.

> **Note:** Trends in cancer prevalence, incidence, and mortality can be affected by cancer screening programs. Because the impact of effective screening on cancer rates is dynamic, rates must be interpreted with caution. For example, effective screening for cervical and colorectal cancers may decrease the incidence of cancer because screening procedures such as the Pap test and colonoscopy are capable of finding precancerous tissue. On the other hand, effective screening for breast cancer finds tumors at an early stage, and aggressive screening may initially lead to a noticeable increase in the number of tumors found.

Lifetime risk – "The probability that an individual, over the course of a lifetime, will develop cancer." (ACS Facts 2003)

Prevalence – "Prevalence is the number of cases of a disease, infected persons, or persons with some other attribute present during a particular interval of time." (NCHS)

Incidence – "Incidence is the number of cases of disease having their onset during a prescribed period of time. Incidence is a measure of morbidity or other events that occur within a specified period of time." (NCHS) Cancer incidence has been recorded in RI since the inception of the RI Cancer Registry in 1986.

Mortality – Mortality is the number of deaths during a prescribed period of time.

Survival – "A five-year relative cancer survival rate is the proportion of patients surviving cancer five years after their diagnosis (after adjusting for normal life expectancy). It includes those who are disease-free, in remission, or under treatment. Advances in the ways cancer is diagnosed and treated have increased the number of people who live long periods of time free of their disease." (Vermont)

Incidence and mortality are often expressed as rates. Different types of rates and other statistical terms used in this report are as follows:

Crude Rate - A crude rate is the number of cases per 100,000 in a given population.

Age-adjusted Rate - An age-adjusted rate is a weighted average of crude rates, where the crude rates are calculated for different age groups and the weights are the proportions of persons in the corresponding age groups of a standard population. Age-adjustment statistically modifies rates to eliminate the effect of different age distributions in different populations.

Confidence Intervals – A range of values around a rate constructed so that this range has a specified probability of including the true value of the rate. The specified probability is called the confidence level, and the end points of the confidence interval are called the confidence limits. (CDC Reproductive Health) "If the confidence intervals of two groups overlap, then any difference between the two rates is not statistically significant." (Vermont)

Data Sources

Types of data contained in this report have been summarized in the table below, along with the data source as abbreviated in figures, data source as full citation, and brief descriptions of the data source.

Data		Abbreviated Data Source	Data Source as Full Citation	Brief Description
Prevalence (25-year estimates)	RI	National Cancer Institute**	Estimates for RI, based on US prevalence rates from CT SEER Registry and 2000 census population data for RI. CT SEER prevalence rates available at: **http://srab.cancer.gov/prevalence/**	Cancer prevalence proportions by anatomical site and sex derived from Connecticut data and made available for public use by the NCI were multiplied by 2000 RI population projections by sex and age to produce "25-year prevalence" estimates by anatomical site and sex for RI, 2000.
Cancer Rates: Incidence	RI	RICR, HEALTH; calculated with *SEER*Stat* +	Rhode Island Cancer Registry, Rhode Island Department of Health.	The Rhode Island Cancer Registry (RICR), established in October 1986, is a statewide surveillance database that contains information on all cancer diagnoses in Rhode Island (RI). The Registry produces official cancer statistics for the State and supplies cancer data to researchers (using strict guidelines for protecting patient confidentiality). Rhode Island General Laws requires health care providers in Rhode Island to report of all new cancer diagnoses to the Registry.
	US	*SEER Cancer Statistics Review, 1973-1999*	Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Edwards BK (eds). *SEER Cancer Statistics Review, 1973-1999*, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1973_1999/, 2002.	Published report
		SEER Cancer Statistics Review, 1975-2000	Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Fay MP, Feuer EJ, Edwards BK (eds). *SEER Cancer Statistics Review, 1975-2000*, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2000, 2003.	Published report
		SEER Public-Use 1973-2000 Data, calculated with *SEER*Stat* +	Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 9 Regs, Nov 2002 Sub (1973-2000), National Cancer Institute, DCCPS, Surveillance Research Program, Cancer Statistics Branch, released April 2003, based on the November 2002 submission.	"The SEER 9 registries are Atlanta, Connecticut, Detroit, Hawaii, Iowa, New Mexico, San Francisco-Oakland, Seattle-Puget Sound, and Utah. Data are available for cases diagnosed from 1973 and later for these registries with the exception of Seattle-Puget Sound and Atlanta. The Seattle-Puget Sound and Atlanta registries joined the SEER program in 1974 and 1975, respectively." (www.seer.cancer.gov)
Cancer Rates: Mortality	RI	Office of Vital Records, HEALTH; calculated with *SEER*Stat* +	Office of Vital Records, Rhode Island Department of Health.	The Office of Vital Records at the RI Department of Health registers, files, and maintains all death records for the state. The advantage to using this data source is that an accurate denominator based on interpolation between the 1990 and 2000 censuses can be used, and the data are available through 2001. However, out-of-sate deaths for 2001 are not yet included.
	RI or US	**SEER US Mortality 1969-2000 Data,** calculated with *SEER*Stat* +	Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Mortality - All COD, Public-Use With State, Total U.S. (1969-2000), National Cancer Institute, DCCPS, Surveillance Research Program, Cancer Statistics Branch, released April 2003. Underlying mortality data provided by NCHS (www.cdc.gov/nchs).	SEER mortality data, calculated with SEER*Stat or accessible through a web query system, is based on NCHS mortality data. The advantage to using this data source is that it contains out-of-state deaths for 2001. However, data are based on population projections from the 1990 Census, rather than interpolated population estimates.
		CDC WONDER, CDC	CDC WONDER, Centers for Disease Control and Prevention. http://wonder.cdc.gov/	CDC WONDER is a web query system with underlying mortality data from NCHS. The advantage to using this data source is that it uses an accurate denominator based on interpolation between 1990 and 2000 censuses. However, it only has deaths updated through 1999.

Risk Factors	RI	RI-BRFSS, HEALTH	RI Behavioral Risk Factor Surveillance System*, Office of Health Statistics, HEALTH. http://www.cdc.gov/brfss/	The BRFSS is an annual telephone survey that measures health risk behaviors among adults 18 years and older. The BRFSS data contained in this report was supported by Cooperative Agreement Number U58/CCU100589 from the Centers for Disease Control and Prevention. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of Centers for Disease Control and Prevention.
	US	BRFSS, CDC	Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention.	Same as **Risk Factors**: RI-BRFSS, HEALTH
Prevention	N/A	N/A	N/A	N/A
Screening	RI	RI-BRFSS, HEALTH	RI Behavioral Risk Factor Surveillance System***, Office of Health Statistics, HEALTH. http://www.cdc.gov/brfss/	Same as **Risk Factors**: RI-BRFSS, HEALTH
	US	BRFSS, CDC	Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention.	Same as **Risk Factors**: RI-BRFSS, HEALTH
Treatment: ACOS programs	RI	RICR, HEALTH	Rhode Island Cancer Registry, Rhode Island Department of Health.	ACOS approved hospital treatment programs are measured as the percent of cancer case reports (a report represents a set of encounters for cancer diagnosis or cancer treatment of an individual) in RI that were or are from ACOS approved hospital cancer treatment programs. This excludes diagnoses or treatments that are made in other states or in RI laboratories. From 1989 through 1996, six hospitals had ACOS-approved cancer programs. Four other programs were approved between 1998 and 2002, bringing the total to ten.
Treatment: AJCC staging	RI	RICR, HEALTH	Rhode Island Cancer Registry, Rhode Island Department of Health.	AJCC staging methodology, an important basis for choosing appropriate treatments, is measured as the percent of cancer cases in RI that were staged with AJCC staging methodology.
Survival (5-yearr survival rates)	US	*SEER Cancer Statistics Review, 1975-2000*	Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Fay MP, Feuer EJ, Edwards BK (eds). *SEER Cancer Statistics Review, 1975-2000*, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2000, 2003.	Published report

N/A Not applicable for summary in this table because data is from various sources that differ based on cancer types.
+Surveillance Research Program, National Cancer Institute SEER*Stat software (www.seer.cancer.gov/seerstat) version <**5.0.20**>.

Key for Maps

Due to Rhode Island's immense coastline and many small islands, it may be difficult to determine county borders in the geographical maps included in this report. The key at right is provided to help you distinguish Rhode Island's five counties. All mapping was done by **HEALTHgis**, HEALTH's geographic information system, with spatial data from the Rhode Island Geographic Information Systems.

Rationale for Selection of Cancer Sites

In addition to discussing the overall burden of cancer in RI, this report highlights cancers of eight sights - the breast, cervix, colon-rectum, lung, melanoma of skin, oral cavity, ovaries, and prostate – which appear in alphabetical order. These were chosen because they have a known control strategy, either through prevention, screening, or effective treatment. Most of these cancers are also the most significant causes of cancer burden.

CANCER IN THE UNITED STATES

An estimated 8.9 million Americans alive in January 1999 had some history of cancer, either current or past. (ACS Facts 2003) In the US, the lifetime risk of developing cancer is a little less than 1 in 2 for men, and a little more than 1 in 3 for women. (ACS Facts 2003)

In 2003, it is expected that approximately 1,334,100 new cases of invasive cancer will be diagnosed in the US (includes noninvasive cancer of the urinary bladder, and does not include basal and squamous cell skin cancers). (ACS Facts 2003) Among men, incidence for all cancers combined increased steadily for most of the 1970's and 1980's. The rate peaked and declined in the early 1990's and changed little in the later half of the decade. Among women, the incidence for all cancers combined has increased slowly since at least the 1970's. (SEER Incidence) In men, cancer occurs most frequently in the prostate, lung, and colon-rectum. The most common cancers among females are cancers of the breast, lung, and colon-rectum.

In 2003, it is expected that approximately 556,500 Americans will die of cancer. (ACS Facts 2003) Responsible for one in four deaths, cancer is the second leading cause of death in the US (behind heart disease). At the national level, mortality from cancer increased for most of the 1970's and 1980's although decreasing rates in the 1990's brought the cancer mortality rate close to what it was in the early 1970's. (SEER Mortality) The most deadly cancers among men are cancers of the lung, prostate, and colon-rectum. The most deadly cancers among women are cancers of the lung, breast, and colon-rectum.

Cancer is a profound public health problem, costing an estimated $171.6 billion in the year 2002, as follows:

- $60.9 billion for direct medical costs (total of all health expenditures);
- $15.5 billion for indirect morbidity costs (cost of lost productivity due to illness); and
- $95.2 billion for indirect mortality costs (cost of lost productivity due to premature death). (ACS Facts 2003)

CANCER IN RHODE ISLAND

Cancer is a major cause of morbidity and mortality in Rhode Island, as it is in the United States as a whole. About four out of every 10 people in Rhode Island will develop cancer sometime in the course of their lives, and half of them will die of the disease. At any one time, it is estimated that over 33,000 Rhode Islanders are living with cancer or are cancer survivors. In 2003, an estimated 5,800 new cancer cases will be diagnosed, and an estimated 2,400 Rhode Islanders will die of the disease. (ACS Facts 2003) Cancer is the second leading cause of death in RI. According to data from 1995-1999, Rhode Island ranks 13th in highest overall cancer mortality rates among the 50 states and Washington D.C. (ACS Facts 2003)

Rhode Island cancer mortality, among the highest in the nation, displays an "urban profile." When the differential between RI and US rates is decomposed, it is found to be caused by cancers of a limited number of anatomical sites, including cancers in which diet is implicated and cancers related to tobacco use. Mortality rates from these cancers are elevated in urban areas throughout the developed world. Please see **Special Studies: Cancer in an Urban State** (section 14) for more information.

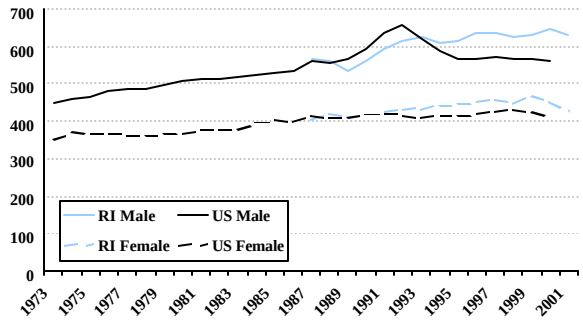
Working from American Cancer Society estimates for the nation as a whole, and prorating them on the basis of total population, cancer costs RI about $545 million per year, about $196 million in direct medical costs, and about $349 million in lost productivity from illness and death. (ACS Facts 2002)

Cancer Trends

Over the past decade, the incidence of all cancers combined increased among Rhode Island men. Among Rhode Island women, cancer incidence increased for most of the 1990's but has decreased in recent years. The increase in cancer incidence rates can be partly attributed to the development and use of cancer screening techniques which are effective in finding cancerous lesions at early stages.

RI has experienced higher rates of cancer mortality than the nation over a period of at least five decades. Although this continued into the 1990s, the difference between RI and US cancer mortality rates, among both males and females, has gotten smaller over time.

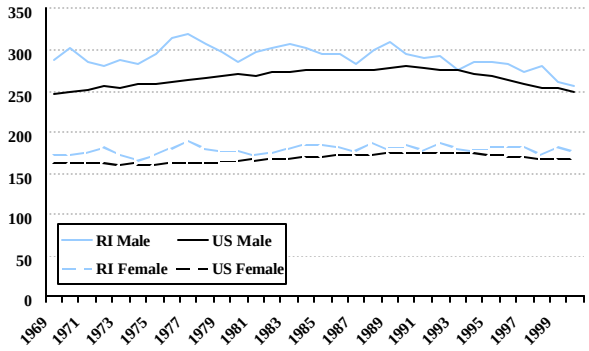
Figure 5-1. Cancer incidence for all cancers combined by year and sex
Annual invasive cancer incidence rates** by sex for all cancers combined, RI and US, 1973-2001.*



* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Overall cancer incidence rates among RI males increased from 566.4 cases per 100,000 in 1987 to 633.7 in 2001. Among RI females, rates increased from 407.1 cases per 100,000 in 1987 to 470.3 in 1999, then decreased to 428.6 in 2001. Overall cancer incidence rates among US males increased from 448.5 cases per 100,000 in 1973 to 656.8 in 1992, then decreased to 560.2 in 2000. Among US females, rates increased from 349.5 cases per 100,000 in 1973 to 413.8 in 2000.

Figure 5-2. Cancer mortality by year and sex for all cancers combined
Annual cancer mortality rates by sex for all cancers combined, RI and US, 1969-2000.*



* Rates are age-adjusted to the 2000 US standard population, expressed as deaths per 100,000 population.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

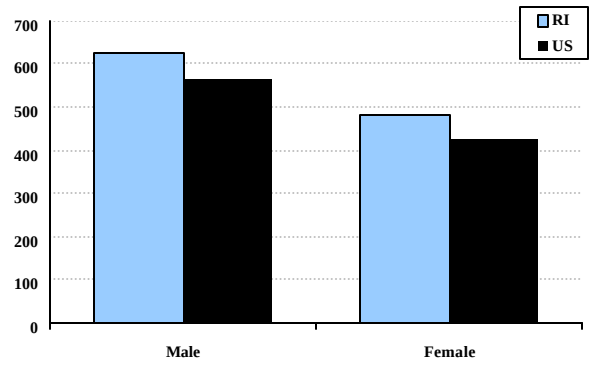
Overall cancer mortality rates among RI males hovered around 300 deaths per 100,00 from 1969 to 1996. In 1998-2000, rates were the lowest they have been since 1969. Among RI females, rates hovered around 180 deaths per 100,000 from 1969 to 2000. Overall cancer mortality rates among US males increased from 247.6 deaths per 100,000 in 1969 to 279.8 in 1990 then returned to 249.8 in 2000. Among US females, rates increased from 163.2 deaths per 100,000 in 1969 to 175.3 in 1991 then decreased to 167.3 in 2000.

Cancer Disparities

Cancer by sex

Differentials in cancer rates by sex are expected. They can be related to internal factors that differ between males and females, such as reproductive systems, or to external factors, such as historical lifestyle differences (i.e., occupational exposures to carcinogens, historical trends in smoking). For this reason, all rates presented in this report have been calculated as sex-specific rates. In both Rhode Island and the nation as a whole, the burden of cancer is higher among men than women. This disparity is largely attributable to cancers of the colon-rectum, lung-bronchus, and urinary bladder.

Figure 5-3. Cancer incidence by sex for all cancers combined
Cancer incidence rates by sex for all cancers combined, RI and US, 1996 -2000.*

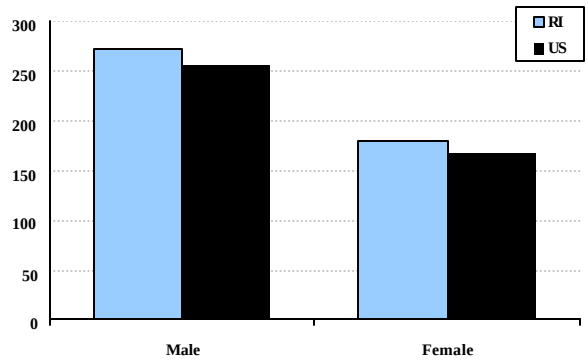


* Rates are age-adjusted to the 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973 -2000 Data; calculated with *SEER*Stat*.

In both RI and the US, overall cancer incidence rates are higher among males than females. In RI, the male incidence rate for all cancers combined is 30% higher than the female rate. A similar disparity is seen in the US rates. RI rates are higher than US rates for both males and females.

[Note: RI incidence data for 2001 is currently available. US incidence data is only available through 2000. For comparability, the figure at left contains RI data through 2000.]

Figure 5-4. Cancer mortality by sex for all cancers combined
Cancer mortality rates by sex for all cancers combined, RI and US, 1996-2000.*



* Rates are age-adjusted to the 2000 US standard population, expressed as deaths per 100,000 population.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

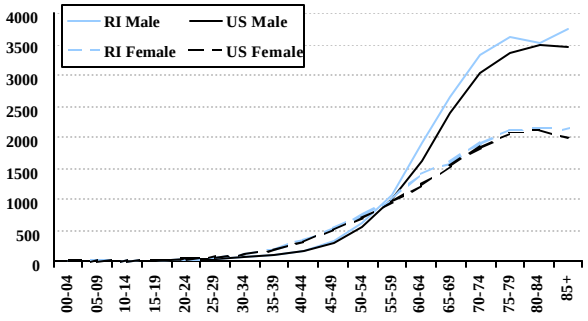
In both RI and the US, cancer mortality rates are higher among males than females. In RI, the male cancer rate for all sites combined is 51% higher than the female rate. A similar disparity is seen in the US rates, although RI rates are higher than US rates for both males and females.

Cancer by age and sex

Cancer differentials by age are expected. Due to both internal factors, such as normal aging processes, and external factors, such as exposure to carcinogens, cancer is largely a disease of age. With a population that is both growing and aging, even if cancer rates remain stable, the number of people diagnosed with cancer is expected to increase. (Age) Researchers anticipate that if cancer rates follow current patterns, between 2000 and 2050, the number of people diagnosed with cancer in the US will double. (Age)

Careful consideration must be taken when comparing populations with different age distributions. As discussed in **About the Data** (section 3), age-adjustment of rates eliminates the effect of different age distributions in different populations. For this reason, all rates presented in this report are age-adjusted.

Figure 5-5. Cancer incidence by age and sex for all cancers combined
Invasive cancer incidence rates** by age and sex for all cancers combined, RI and US, 1996-2000.*

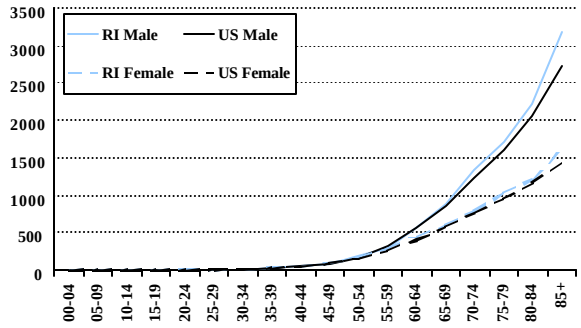


* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-specific, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Age-specific cancer incidence rates show that deaths from cancer increase dramatically with age. Cancer incidence is disproportionately higher among males than females.

[Note: RI incidence data for 2001 is currently available. US incidence data is only available through 2000. For comparability, the figure at left contains RI data through 2000.]

Figure 5-6. Cancer mortality by age and sex for all cancers combined
Cancer mortality rates by age and sex for all cancers combined, RI and US, 1996-2000.*



* Rates are age-specific, expressed as deaths per 100,000 population.
Source: SEER Incidence and US Mortality Statistics, NCHS

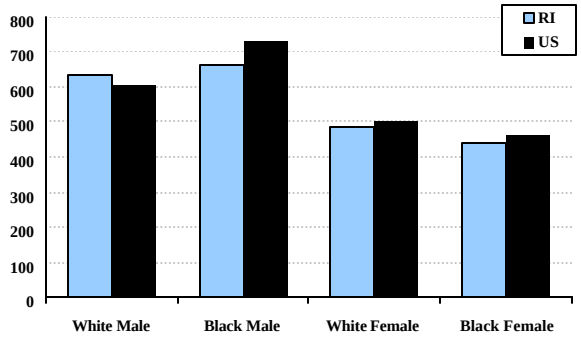
Age-specific cancer mortality rates show that deaths from cancer increase dramatically with age. The burden of cancer death is disproportionately higher among males than females.

Cancer by race and sex

Even though incidence rates from all cancers combined are higher among white females than black females, mortality rates from all cancers combined are higher among blacks than whites in RI. With few unproven exceptions, there is no expected internal or genetic reason for this racial differential. Cancer prevention and control efforts may not have effectively reached minority populations. Several factors may be involved, such as late stage of disease at diagnosis, health care access, disease history, genetic differences, survivorship, risk factors, and health behaviors. (Race) This report addresses racial differentials because they may indicate a failure of public health or health care systems.

Due to the small numbers of cases and deaths when stratifying RI data by race, sex, and year, this report provides data by race and sex for the combined years 1987-2000. This format is used throughout the report for cancers of individual anatomical sites by race.

Figure 5-7. Cancer incidence by race and sex for all cancers combined
Average annual cancer incidence rates by race and sex for all cancers combined, RI and US, 1987-2000.*



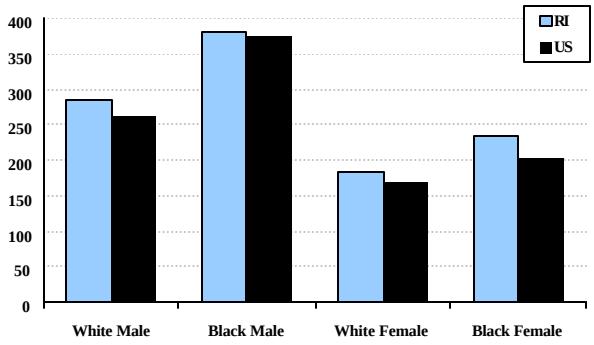
* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Among RI males, cancer incidence rates are slightly higher among blacks than whites. This disparity is larger in the US than in RI. Among females, both in RI and the US, cancer incidence rates for white population are slightly higher than among the black population. RI rates are slightly lower than US rates, except among white males.

[Note: RI incidence data for 2001 is currently available. US incidence data is only available through 2000. For comparability, the figure at left contains RI data through 2000.]

Figure 5-8. Cancer mortality by race and sex for all cancers combined

Average annual cancer mortality rates by race and sex for all cancers combined, RI and US, 1987-2000.*



* Rates are age adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

Among RI males and US males, cancer mortality is higher among blacks than whites. This disparity is larger in the US than in RI. Among females in RI and the US, cancer mortality rates among the black population are higher than among the white population. RI rates are slightly higher than US rates for whites and blacks of both sexes.

Note: Please see **Appendix: Rhode Island Cancer Rates, 1997-2001 – Detailed Tables** (section 18) for more detailed tables of cancer by sex, race, site, and county.

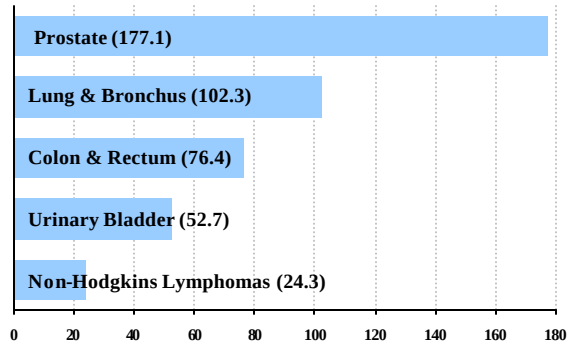
Common Cancers

In 2003, an estimated 5,800 cancer cases will be diagnosed in RI. The four leading cancer diagnoses are cancers of the prostate (estimated 900 new cases), lung and bronchus (800 new cases), female breast (800 new cases), and colon and rectum (700 new cases). (ACS Facts 2003) Leading cancer sites differ for males and females.

In 2003, an estimated 2,400 Rhode Islanders will die of cancer. The four most deadly cancers in RI are cancers of the lung and bronchus (700 estimated new deaths), colon and rectum (300 estimated new deaths), female breast (200 estimated new deaths), and prostate (100 estimated new deaths). (ACS Facts 2003) Leading causes of cancer death differ for males and females.

Figure 5-9. Leading male cancer sites

Cancer incidence rates among males, RI, 1997-2001.*

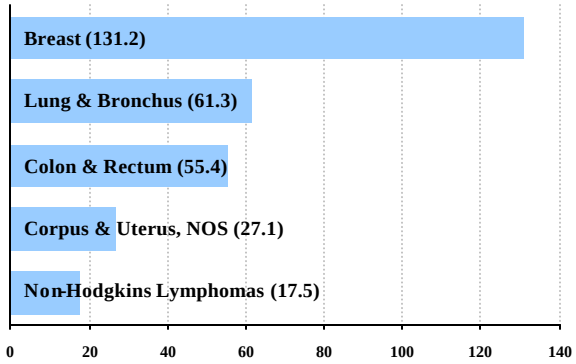


* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; calculated with *SEER*Stat*.

Among RI males, cancer incidence rates are highest for cancers of the following sites: prostate; lung and bronchus; colon and rectum; urinary bladder; and non-Hodgkins lymphomas.

Figure 5-10. Leading female cancer sites

Cancer incidence rates among females, RI, 1997-2001.*

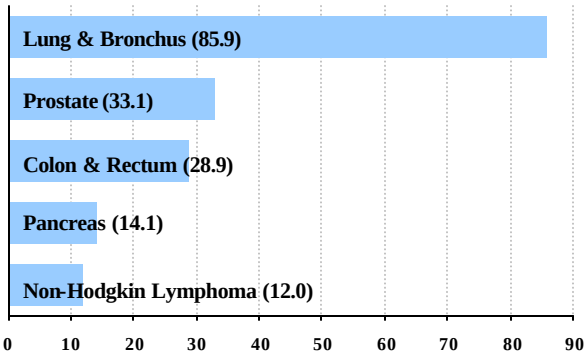


* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; calculated with *SEER*Stat.*

Among RI females, cancer incidence rates are highest for cancer of the following sites: breast; lung and bronchus; colon and rectum; corpus and uterus, not otherwise specified; and non-Hodgkins lymphomas.

Figure 5-11. Leading male cancer deaths

Cancer mortality rates among males, RI, 1996-2000.*

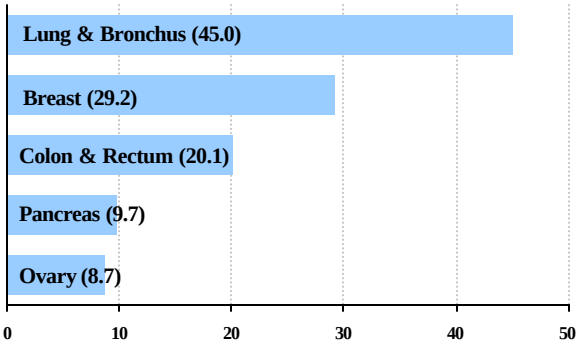


* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population..
Source: Office of Vital Records, HEALTH; calculated with *SEER*Stat.*

Among RI males, cancer mortality rates are highest for cancers of the following sites: lung and bronchus; prostate; colon and rectum; pancreas; and non-Hodgkins lymphomas.

Figure 5-12. Leading female cancer deaths

Cancer mortality rates among females, RI, 1996-2000.*



* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: Office of Vital Records, HEALTH; calculated with *SEER*Stat.*

Among RI females, cancer mortality rates are highest for cancers of the following sites: lung and bronchus; breast; colon and rectum; pancreas; and ovary.

BREAST CANCER

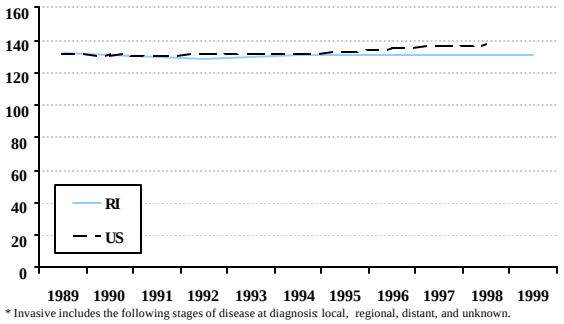
Breast cancer forms in the tissues of the breast. About 80% of all breast cancer cases originate in the lining of the ducts, or passageways, of the breast; this type of breast cancer is called ductal carcinoma. Another 10-15% of all breast cancer cases originate in the lobes of the breast and are called lobular carcinoma. Although cancer originates in these sites, it can spread and invade other areas of breast tissue and the underlying muscle. If the cancerous cells travel to the lymph nodes, they can spread to other areas of the body through the lymphatic system. (RICAN)

Breast cancer is the most commonly diagnosed cancer among RI females (annual average of 812 newly diagnosed cases in each of the five years 1997-2001), and accounted for 14% of all newly diagnosed cancers in 1997-2001, including both males and females. Breast cancer is the second leading cause of cancer death among RI females (annual average of 194 deaths in each of the five years 1996-2000), and accounted for 8% of all cancer deaths in 1996-2000, including both males and females. In Rhode Island, approximately 8,900 females alive today were diagnosed with breast cancer at some point in the past 25 years (2000). (RICR)

Cancer Rates

Figure 6-1. Female breast cancer incidence by year

Average annual invasive breast cancer incidence rates** by year among females, RI and US, 1987-2001***.*

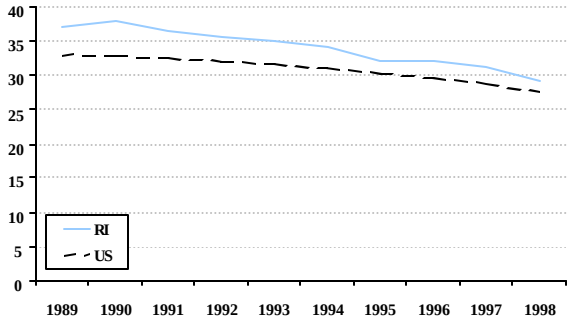


* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are five-year moving averages.
Source: RICR, HEALTH – calculated with *SEER*Stat; SEER Cancer Statistics Review 1973-1999;* 1999 US data is from SEER Public-Use 1973-2000 Data – calculated with *Seer*Stat.*

The age-adjusted incidence of invasive breast cancer among RI females of all races stayed about the same from 1989 to 1999, hovering around 130 cases per 100,000 females (based on five-year moving averages). In contrast, the age-adjusted incidence of invasive breast cancer among US females of all races increased from about 131 cases per 100,000 females in 1989 to about 137 cases per 100,000 females in 1997 (based on five-year moving averages).

Figure 6-2. Female breast cancer mortality by year

Average annual breast cancer mortality rates by year among fema les, RI and US, 1987-2000**.*

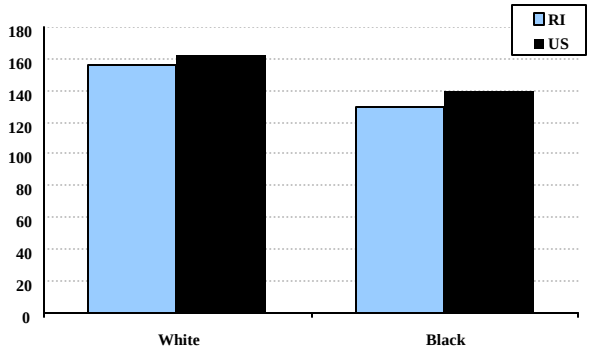


* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are five-year moving averages.
Source: CDC WONDER, CDC; 1998 US data from SEER US Mortality 1969-2000 Data – calculated with *SEER*Stat*.

The age-adjusted mortality of invasive breast cancer among RI females of all races declined from 37 deaths per 100,000 in 1989 to 30 deaths per 100,000 in 1997 (based on five-year moving averages). Similarly, the age-adjusted mortality of invasive breast cancer among US females of all races declined from 33 in 1989 to 28 in 1997 (based on five-year moving averages). RI breast cancer mortality rates for females were higher than US rates throughout the period of observation.

Figure 6-3. Female breast cancer incidence by race

Average annual invasive breast cancer incidence rates by race among females, RI and US, 1987-2000.*



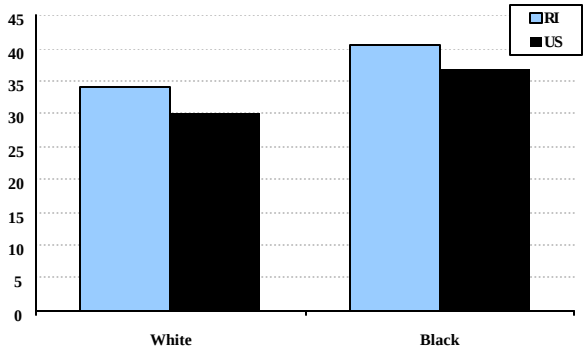
* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

In RI, during 1987-2000, female breast cancer incidence rates were higher among white females (156 cases per 100,000) than among black females (129 cases per 100,000). This gap was similar among US white females (163 cases per 100,000) and US black females (140 cases per 100,000).

[Note: RI incidence data for 2001 is currently available. US incidence data is only available through 2000. For comparability, the figure at left contains RI data through 2000.]

Figure 6-4. Female breast cancer mortality by race

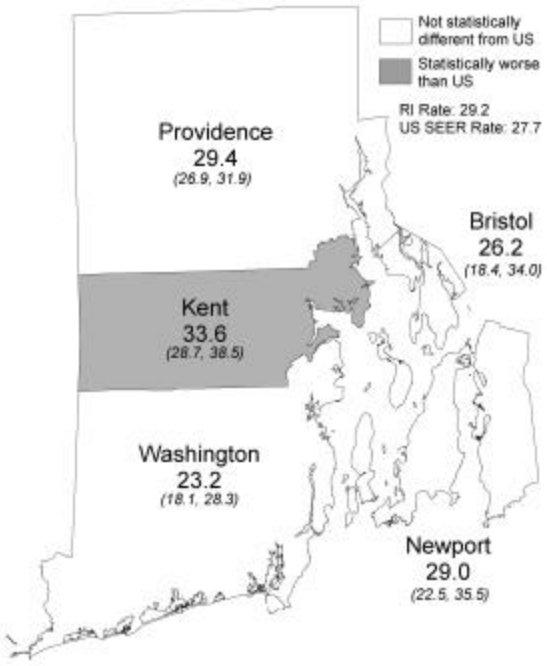
Average annual breast cancer mortality rates by race among fema les, RI and US, 1987-2000.*



* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

In RI, during 1987-2000, female breast cancer mortality rates were higher among black females (41 deaths per 100,000) than among white females (34 deaths per 100,000). This gap was similar among US black females (37 deaths per 100,000) and US white females (30 deaths per 100,000).

Figure 6-3. Female breast cancer mortality by county
Average annual breast cancer mortality rates among females by county, RI, 1996-2000.*



In 1996-2000, the average annual breast cancer mortality rate among females in Kent county (34 deaths per 100,000) was significantly higher than the US rate (28 deaths per 100,000).

[Note: Maps are color-coded based on comparison to US mortality rates. When the US rates fall within the 95% confidence interval (shown in parentheses), it suggests that there is no statistical difference. Please see Key for Maps in **About the Data** (section 3) for a clear delineation of counties.]

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000.
Data source: Office of Vital Records, HEALTH; calculated with *SEER*Stat* .
Map source: HEALTH gis.

Healthy People 2010 **Targets**
Mortality: By 2010, reduce the breast cancer death rate to 22.3 deaths per 100,000 females (age-adjusted to the year 2000 standard population of the United States; baseline = 27.9 deaths per 100,000 females in 1998).

Risk Factors

Non-modifiable risk factors for breast cancer include female gender (men can develop breast cancer but it is much more common among women), older age (risk of developing breast cancer increases with age), family history, and genetic risk factors (most commonly, the presence of BRCA1 and BRCA2 genes). (Clinical, ACS Breast) Women with a previous history of breast cancer, history of atypical hyperplasia on breast biopsy, or history of proliferative breast disease without atypia are also at increased risk. (Clinical) White females have a higher risk of developing breast cancer, although black women have a higher risk of dying from breast cancer. (ACS Breast)

Suggested modifiable risk factors for breast cancer include late age at first pregnancy, not bearing children, high socioeconomic status, and history of exposure to high-dose radiation. (Clinical) Associations have also been suggested between breast cancer and oral contraceptives, long-term estrogen replacement therapy, obesity (particularly in post-menopausal women), and a diet high in fat. However, causal relationships have not been established for these associated risk factors. (Clinical)

Prevention

Although breast cancer has been linked to a variety of risk factors, effective preventives are unknown.

Screening

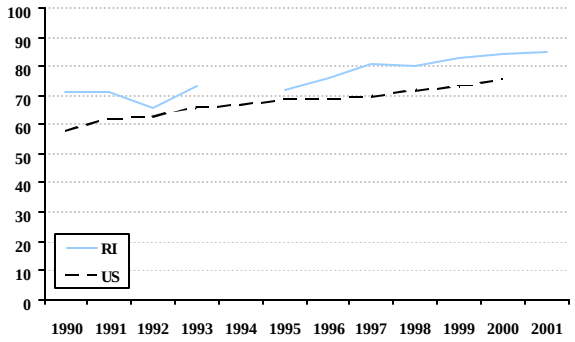
Common screening tests for early detection of breast cancer are mammography, clinical breast examination (CBE), and breast self-examination (BSE). (Clinical) Mammography is effective in finding in situ and localized tumors, which are more likely to be controlled and "cured" than later stage (regional and distant) tumors. A number of clinical trials and clinical-trial-like studies have demonstrated the effectiveness of mammography screening for the reduction of breast cancer mortality, although few researchers have questioned the quality of these studies and the validity of their results. (Gotzsche, Olsen) Despite the recent controversies associated with screening, its aggressive use remains a key control strategy.

The American Cancer Society recommends (ACS):

- Women age 40 and older should have a screening mammogram every year, and should continue to do so for as long as they are in good health.
- Women in their 20s and 30s should have a clinical breast examination (CBE) as part of a periodic (regular) health exam by a health professional preferably every 3 years. After age 40, women should have a breast exam by a health professional every year.
- BSE is an option for women starting in their 20s. Women should be told about the benefits and limitations of BSE. Women should report any breast changes to their health professional right away.
- Women at increased risk should talk with their doctor about the benefits and limitations of starting mammograms when they are younger, having additional tests, or having more frequent exams. Women should discuss with their doctor what approaches are best for them. Although the evidence currently available does not justify recommending ultrasound or MRI for screening, women at increased risk might benefit from the results.

Figure 6-6. Female breast cancer screening by year

Percent of female respondents, age 40 and older, who report that they have had a mammogram within the past two years, RI and US, 1990-2001.



Source: RI -BRFSS, HEALTH; BRFSS, CDC.

The proportion of RI females ages 40 years and older of all races who had received a mammogram within the preceding two years increased from 71% in 1990 to 85% in 2001. Nationally, the median proportion of females ages 40 years and older of all races who had received a mammogram within the preceding two years increased from 58% in 1990 to 76 % in 2000.

From 1989 to 1999, trends in stage-specific breast cancer incidence rates are consistent with screening rates. When broken down by stage of disease at diagnosis, the incidence of *in situ*

and localized breast tumors increased while the incidence of regional or distant breast tumors decreased.

***Healthy People 2010* Targets**
Screening: By 2010, increase the proportion of females ages 40 years and older who have received a mammogram within the preceding 2 years to 70% (baseline = 67% in 1998).

Treatment

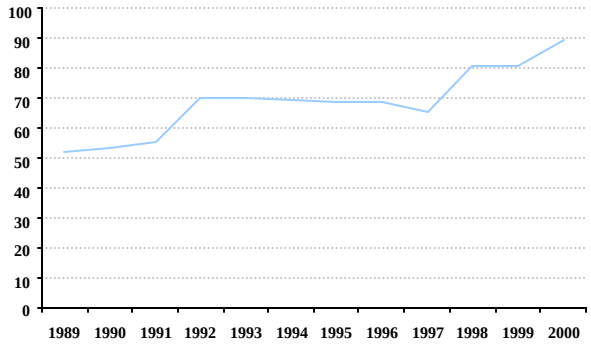
A variety of surgical and non-surgical treatments are available for breast cancer. Appropriate treatment options are determined on an individual basis and depend upon the stage at which the cancer was discovered. Surgical treatment options include lumpectomy, partial mastectomy, total mastectomy, modified radical mastectomy, and radical mastectomy. Non-surgical treatment options include radiation therapy, chemotherapy, hormone therapy, and clinical trials. (RICAN)

In September 2002, the RI Breast Care Task Force distributed the Breast Care Algorithm to oncologists in RI. The Breast Care Algorithm is a "tool for getting cutting-edge, research-based cancer treatment to all RI women." It provides a model of breast health care that gives physicians guidance on how to manage breast cancer. (Algorithm)

The percent of female breast cancer cases in RI ACOS-approved treatment programs and the percent staged with AJCC staging methodology is detailed below.

Figure 6-7. Female breast cancer in ACOS programs by year

Percent of breast cancer cases that were or are treated in ACOS approved cancer treatment programs by year among females, RI, 1989-2000.

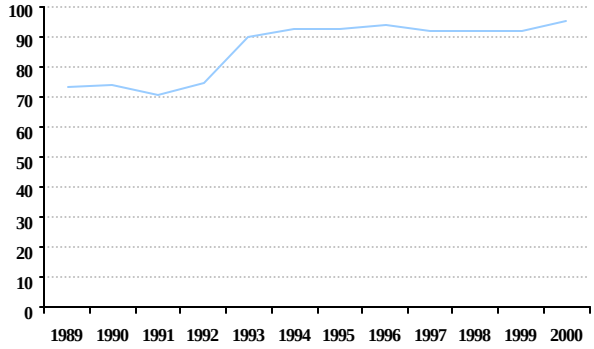


Source: RICR, HEALTH

The percent of female breast cancer case reports from ACOS approved hospital cancer treatment programs in RI increased from 52% in 1989 to 70% in 1992. This proportion remained around 70% from 1992 to 1997, and then increased to 90% in 2000.

Figure 6-8. Female breast cancer with AJCC staging by year

Percent of breast cancer cases staged with AJCC staging methodology by year among females, RI, 1989-2000.



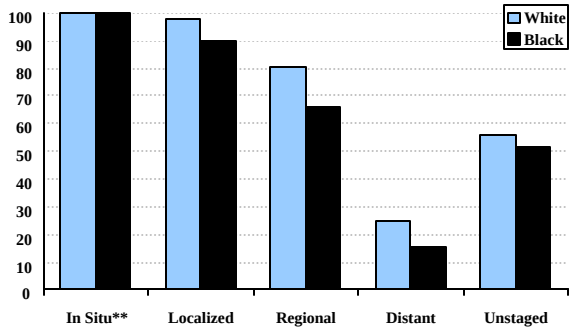
Source: RICR, HEALTH

Prior to a change in the Rules and Regulations of the Rhode Island Cancer Registry in 1992, only about 75% of the breast cancer cases newly diagnosed among RI females were staged using the AJCC system. After the Rules change, the proportion of cases with AJCC staging increased to 90%, and has averaged 93% from 1993 through 2000.

Survival

Figure 6-9. Female breast cancer survival rates by race and stage

Invasive breast cancer five-year relative survival rates by race and stage of disease at diagnosis among females, US, 1992-1999.*



* Survival rates are relative rates expressed as percents
** In situ cases are not considered invasive.
Source: *SEER Cancer Statistics Review, 1975-2000.*

In the US, five year relative survival rates for female breast cancer differ both by stage of disease at diagnosis and by race. Based on data from 1992-1999, breast cancers diagnosed while in situ have survival rates of 100% for both blacks and whites, while cancers diagnosed at later stages have much lower survival rates. For cancers of stages other than in situ, survival rates are higher among whites than among blacks.

Discussion

Summary of Burden

Breast cancer contributes substantially to the cancer burden in Rhode Island.

Among Rhode Island women, breast cancer is the most commonly diagnosed cancer and the second leading cause of cancer death. Approximately 8,900 women alive today were diagnosed with breast cancer at some point in the past 25 years.

In Rhode Island, mortality from breast cancer decreased in the 1990's.

In Rhode Island over the period 1987-2000, mortality from breast cancer decreased 19%, from 37 to 30 deaths per 100,000 women.

Relative Burden

Female breast cancer incidence is lower in Rhode Island than in the United States as a whole, probably due to different screening dynamics.

In recent years, the United States female breast cancer incidence rate has exceeded the Rhode Island rate by about 5%, probably because of differences in screening dynamics between the two areas.

Female breast cancer mortality is higher in Rhode Island than in the United States as a whole.

The Rhode Island female breast cancer mortality rate exceeded the United States rate by about 13% in 1990. By the year 2000, the percent elevation had dropped to 5%.

Disparities

In Rhode Island, black women are less likely to survive breast cancer than white women.

In Rhode Island between 1987 and 2000, white women experienced one breast cancer fatality for every 4.6 newly diagnosed cases of breast cancer, while black women experienced one breast cancer fatality for every 3.2 newly diagnosed cases of breast cancer. Research at the national level suggests that later stage of disease at diagnosis, poorer health care access, and differences in disease history may contribute to this differential. (Race)

Kent county bears a greater burden of female breast cancer compared with the nation as a whole.

The female breast cancer mortality rate for Kent county is significantly higher than the United States rate. Kent's higher mortality may reflect lower mammography use than in other areas of the state, and is worthy of further study to test this and other possible reasons for the differential.

Status of Control Strategies

The burden of breast cancer may be reduced by screening women according to guidelines and by assuring state-of-the-art treatment for all breast cancer patients. Although effective preventives for breast cancer are unknown, current screening with mammography is effective in finding in situ and localized tumors, which are more likely to be controlled and "cured" than later stage (regional and distant) tumors. As such, the primary control strategy for female breast cancer in Rhode Island is screening for breast cancer according to national guidelines. Another important control strategy is to assure state-of-the-art treatment for all cancer patients through improvement of basic treatment infrastructure.

In Rhode Island, the proportion of women screened for breast cancer increased in the 1990's.

In response to aggressive promotion from the RI health care community, the percentage of women age 40 and older who report that they have been screened with mammography within the previous two years increased from 71% in 1990 to 85% in 2001. Rhode Island is ahead of the nation in breast cancer screening, and by 2001, Rhode Island had already exceeded the *Healthy People 2010* goal of 70% (HP). Nonetheless, despite a decade and a half of steady progress, 15% of Rhode Island women age 40 and over are not being screened according to guidelines, a cause for concern. Identifying who these women are, and why they have not benefited from the State's substantial breast cancer screening infrastructure may help us plan special interventions to accelerate the upward trend in eligible women screened according to guidelines.

The Women's Cancer Screening Program (WCSP) has helped increase the percentage of Rhode Island women who are screened for breast cancer.

The WCSP aims to increase the percentage of women who receive mammograms (and Pap tests). Based at HEALTH, the WCSP provides free breast cancer screening services for Rhode Island women who are age 40 or older, uninsured or underinsured, and with incomes at or less than 250% of the poverty level. Since 1995, the WCSP has paid for 11,635 mammograms and an equal number of clinical breast examinations that otherwise might not have been done, for lack of financial resources.

Screening with mammography may have contributed to the decrease in breast cancer incidence in Rhode Island.

The effectiveness of screening with mammography is reflected in trends of stage-specific breast cancer incidence rates, analyzed in previous reports (Review). Over the course of the 1990's in Rhode Island, the incidence of *in situ* and localized breast tumors increased, while the incidence of regional and distant tumors decreased, signs of effective screening.

By the year 2000, 7 out of 10 breast cancer case reports in Rhode Island were from American College of Surgeons (ACOS) approved hospitals.

By the year 2000, almost all breast cancer tumors in Rhode Island were staged with American Joint Committee on Cancer (AJCC) methodology.

Cancer Control Priorities for 2004

Reduce the burden of breast cancer by maintaining current levels of breast cancer screening.

Maintain current levels of breast cancer screening by (a) maintaining existing infrastructure, (b) promoting mammography and (c) reaching out to uninsured women through the WCSP.

Reduce the burden of breast cancer by identifying existing barriers to screening.

Identify existing barriers to screening among those women not screened according to guidelines. Conduct a careful analysis of the unscreened population using data from the Behavioral Risk Factor Surveillance System (BRFSS) and the RI-Health Interview Survey (RI-HIS). Search for common characteristics that may identify target audiences and effective interventions.

Reduce the burden of breast cancer by increasing the proportion of breast cancer patients who receive state-of-the-art treatment.

Begin to eliminate disparities by identifying reasons for disparities in relative mortality.

Identify reasons for racial and geographic disparities in relative mortality, using data from the RI Cancer Registry, the BRFSS, the RI-HIS, and death certificates. Investigate variables such as socioeconomic status and stage-specific incidence rates among white and black women and among RI counties.

CERVICAL CANCER

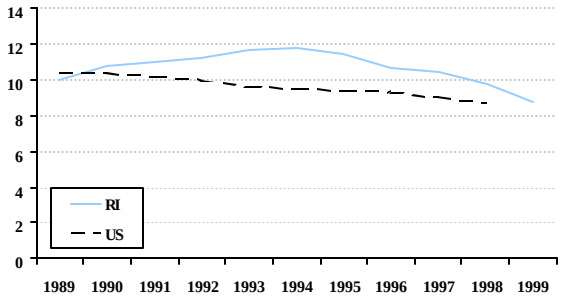
Cervical cancer originates from pre-cancerous lesions on the surface of the cervix. These lesions are known as squamous intraepithelial lesions (SIL) and are distinguished by two different grades. Low-grade SIL describes early mutations that may resolve on their own and not cause problems. However, low-grade SIL can progress to high-grade SIL, a condition in which several precancerous cells exist with severe abnormalities. Again, high-grade SIL are found on the surface of the cervix; progression into deeper tissue signifies development into cancer. High-grade SIL can be treated and therefore prevent development into cancer, however, if untreated for several months or years, they will most likely turn into cancer. As in all cancers, cervical cancer is capable of spreading to other organs of the body. (RICAN)

Cervical cancer is not among the most prevalent cancers in the state (and the nation), but it is significant for cancer control efforts, because of the effectiveness of screening with the Pap test. Among Rhode Islanders, cervical cancers accounted for just under 1% of all newly diagnosed cases (including males and females) in 1996-2000, with an annual average of 49 newly diagnosed cases in each of the five years 1997-2001. Cervical cancers accounted for less than 1% of all cancer deaths in 1996-2000 (including males and females), with an annual average of 17 deaths in each of the five years 1996-2000. In Rhode Island, approximately 621 females alive today were diagnosed with cervical cancer at some point in the past 25 years (2000). (RICR)

Cancer Rates

Figure 7-1. Cervical cancer incidence by year

Average annual invasive cervical cancer incidence rates** by year among females, RI and US, 1987 -2000***.*

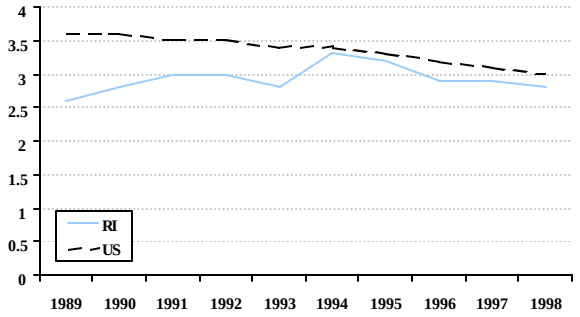


* Rates are age-adjusted to the year 2000 US standard population, represent cases or deaths per 100,000 population, and are five-year moving averages.
** Invasive includes the following stages of disease at diagnos is: local, regional, distant, and unknown
Source: RICR, HEALTH – calculated with *SEER*Stat*; *SEER Cancer Statistics Review, 1973-1999*; 1998 US data is from SEER Public-Use 1973-2000 Data – calculated with *SEER*Stat*.

The age-adjusted incidence of invasive cervical cancer among RI females of all races was 10.0 cases per 100,000 females in 1989, peaked at 11.8 cases per 100,000 females in 1994, then dropped to 8.8 cases per 100,000 in 1999 (based on five-year moving averages). In contrast, the age-adjusted incidence of invasive cervical cancer among US females of all races decreased from 10.4 cases per 100,000 females in 1989 to 8.7 cases per 100,000 females in 1998 (based on five-year moving averages).

Figure 7-2. Cervical cancer mortality by year

Average annual cervical cancer mortality rates by year among females, RI and US, 1987-2000**.*

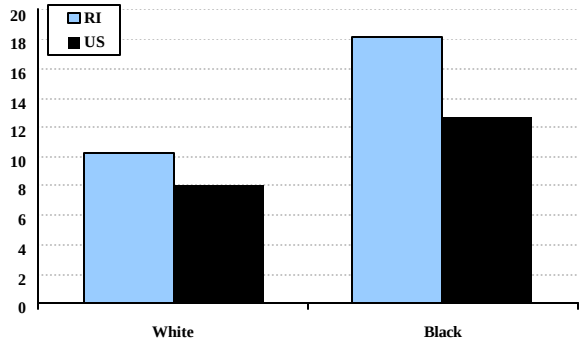


* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are five-year moving averages.
Source: CDC WONDER, CDC; 1998 US data is from SEER US Mortality 1969-2000 Data – calculated with *SEER*Stat*.

The age-adjusted mortality of invasive cervical cancer among RI females of all races hovered around 3 deaths per 100,000 females for the entire period of observation (based on five-year moving averages). The age-adjusted mortality of invasive cervical cancer among US females of all races experienced a small but steady decline from 3.6 deaths per 100,000 females in 1989 to 3.0 deaths per 100,000 females in 1998 (based on five-year moving averages).

Figure 7-3. Cervical cancer incidence by race

Average annual invasive cervical cancer incidence rates by race among females, RI and US, 1987-2000.*



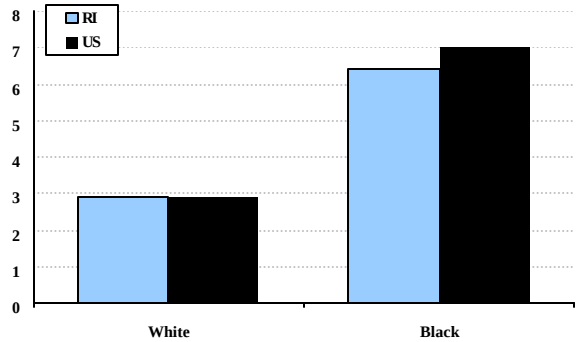
* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

In RI, during 1987-2000, cervical cancer incidence rates were higher among black females (18 cases per 100,000) than among white females (10 cases per 100,000). This gap was similar among US black females (13 cases per 100,000) and white females (8 cases per 100,000).

[Note: RI incidence data for 2001 is currently available. US incidence data is only available through 2000. For comparability, the figure at left contains RI data through 2000.]

Figure 7-4. Cervical cancer mortality by race

Average annual cervical cancer mortality rates by race among females, RI and US, 1987-2000.*



* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

In RI, during 1987-2000, cervical cancer mortality rates were higher among black females (7 deaths per 100,000) than among white females (3 deaths per 100,000). This gap was similar among US black females (6 deaths per 100,000) and US white females (3 deaths per 100,000).

Healthy People 2010 **Targets**
Mortality: By 2010, reduce the cervical cancer death rate to 2.0 deaths per 100,000 females (age-adjusted to the year 2000 standard population of the United States; baseline = 3.0 deaths per 100,000 females in 1998).

Risk Factors

According to current research, infection with human papilloma virus (HPV) is the major cause of cervical cancer. (NCI Cancer Facts, NIH Consensus) All sexually active females are at risk for developing cervical cancer. However, factors that increase risk include low socioeconomic status, history of multiple sexual partners, early onset of sexual intercourse, cigarette smoking, and infection with human immunodeficiency virus (HIV). (Clinical)

Prevention

Modification of sexual behaviors in young people and development of an effective vaccine for HPV may prevent cervical cancer. However, screening with the Pap test, is currently the most important strategy for the prevention of cervical cancer. (NIH Consensus)

Screening

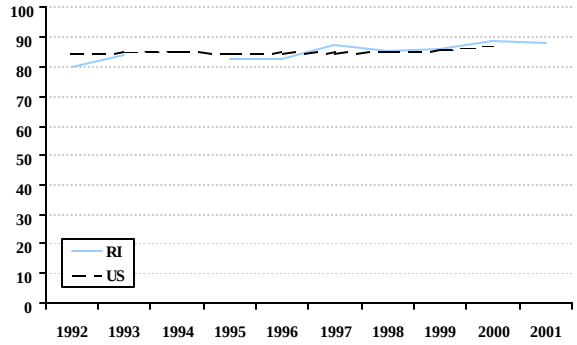
The most clinically significant strategy for the reduction of cervical cancer is use of the Pap test (Pap smear), a noninvasive, inexpensive, simple screening procedure that allows physicians to find and treat precancerous dyplasias and localized tumors. The effectiveness of screening with the Pap test for the reduction of cervical cancer mortality has been demonstrated by several studies. (HP) Although reports of high false-negative and false-positive rates have caused the accuracy of the Pap test to be questioned, the re-screening of smears and the development of computer-based automated technology have reduced the proportion of false results. (Ku)

The American Cancer Society recommends (ACS):

- All women should begin cervical cancer screening about 3 years after they begin having vaginal intercourse, but no later than when they are 21 years old. Screening should be done every year with the regular Pap test or every 2 years using the newer liquid-based Pap test.
- Beginning at age 30, women who have had 3 normal Pap test results in a row may get screened every 2 to 3 years with either the conventional (regular) or liquid-based Pap test. Women who have certain risk factors such as diethylstilbestrol (DES) exposure before birth, HIV infection, or a weakened immune system due to organ transplant, chemotherapy, or chronic steroid use should continue to be screened annually.
- Another reasonable option for women over 30 is to get screened every 3 years (but not more frequently) with either the conventional or liquid-based Pap test, *plus* the HPV DNA test.
- Women 70 years of age or older who have had 3 or more normal Pap tests in a row and no abnormal Pap test results in the last 10 years may choose to stop having cervical cancer screening. Women with a history of cervical cancer, DES exposure before birth, HIV infection or a weakened immune system should continue to have screening as long as they are in good health.
- Women who have had a total hysterectomy (removal of the uterus and cervix) may also choose to stop having cervical cancer screening, unless the surgery was done as a treatment for cervical cancer or precancer. Women who have had a hysterectomy without removal of the cervix should continue to follow the guidelines above.

Figure 7-5. Cervical cancer screening by year

Percent of female respondents, with uterine cervix, age 18 and older, who report that they have had a pap smear within the last three years, RI and US, 1992-2001.



Source: RI -BRFSS, HEALTH; BRFSS, CDC

The proportion of RI females of all races, aged 18 years and older, who had received a Pap test within the preceding 3 years increased from 80% in 1992 to 88% in 2001. Among all the states, in comparison, the median proportion of females of all races, aged 18 years and older, who had received a Pap test within the preceding 3 years increased from 84% in 1992 to 87% in 2000.

From 1989 to 1999, trends in stage-specific cervical cancer incidence rates are consistent with screening rates. When broken down by stage of disease at diagnosis, there was a small peak in the incidence of local and regional cervical tumors. There was no significant change in the incidence of distant cervical tumors and tumors of unknown stage.

[Note: Adoption of the Bethesda System for classifying cervical cytology in the late 1980s made it impossible to distinguish in situ cervical cancer from high grade cervical dysplasias. Thus, cancer case reports for in situ tumors accepted after that time must be considered suspect. Recognition of this fact led to the termination of such reports by cancer registries around the country in 1996.]

***Healthy People 2010* Targets**
Screening: By 2010, increase the proportion of females aged 18 years and older who have ever received a Pap test to 97% (baseline = 92% in 1998), and increase the proportion of females aged 18 years and older who have received a Pap test within the preceding 3 years to 90% (baseline = 79% in 1998).

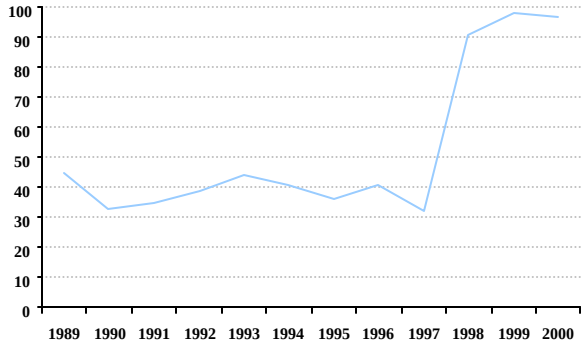
Treatment

Several treatment options for cervical cancer exist, including procedures for pre-cancerous conditions, as well as surgical and non-surgical options for cancerous conditions. Common procedures to treat pre-cancerous conditions include cryosurgery (lesions are frozen using liquid nitrogen), diathermy (heat used to destroy and remove unhealthy cells), laser surgery, loop epithelial excision procedure (electrical wire loop used to slice tissue), conization (cone-shaped sample of tissue removed), or hysterectomy. Surgical treatment options for cervical cancer include simple hysterectomy, radical hysterectomy or pelvic lymph node dissection, or pelvic exenteration (only used in advanced stages). Non-surgical treatment options include chemotherapy, radiation therapy, biological therapy, or clinical trials. (RICAN)

The percent of cervical cancer cases in RI ACOS-approved treatment programs and the percent staged with AJCC staging methodology is detailed below.

Figure 7-6. Cervical cancer in ACOS programs by year

Percent of cervical cancer cases treated in ACOS approved cancer treatment programs by year among females, RI, 1989-2000.

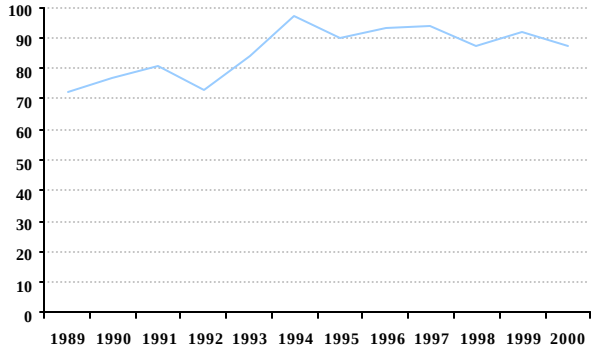


Source: RICR, HEALTH

The percent of cervical cancer case reports from ACOS approved hospital cancer treatment programs in RI remained around 40% from 1989 through 1996, and then increased dramatically from 32% in 1997 to 97% in 2000.

Figure 7-7. Cervical cancer with AJCC staging by year

Percent of cervical cancer cases staged with AJCC staging methodology by year among females, RI, 1989-2000.



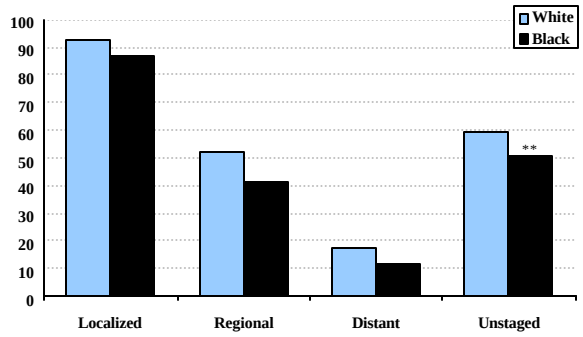
Source: RICR, HEALTH

Prior to a change in the Rules and Regulations of the Rhode Island Cancer Registry in 1992, only about 76% of the cervical cancer cases newly diagnosed among RI females were staged using the AJCC system. After the Rules change, the proportion of cases with AJCC staging increased to 84%, and has averaged 91% from 1993 through 2000.

Survival

Figure 7-8. Cervical cancer survival rates by race and stage

Invasive cervical cancer five-year relative survival rates by race and stage of disease at diagnosis among females, US, 1992-1999.*



* Survival rates are relative rates expressed as percents
** The standard error of the survival rate is between 5 and 10 percentage points.
Source: *SEER Cancer Statistics Review, 1975-2000.*

Based on US data from 1992-1999, five-year relative survival rates for cervical cancer are higher when diagnosed at earlier stages of disease, and are higher among white females than black females. Cervical cancers diagnosed while localized have a survival rate of 93% among white females and 87% among black females. Cancers that are not diagnosed until a distant stage have a survival rate of 18% among whites and 12% among blacks.

Discussion

Summary of Burden

Cervical cancers are preventable; new cases of cervical cancer and cervical cancer deaths are largely the result of failures to screen according to guidelines.

Among RI women, cervical cancer is not one of the most prevalent cancers in the state. However, it is a very important cancer to monitor, because the potential for much higher cervical cancer rates is great, absent aggressive screening for precancerous lesions with the Pap test. The annual averages of 54 newly diagnosed cervical cancer cases and 17 cervical cancer deaths are largely the result of failures to screen.

Relative Burden

The cervical cancer mortality differential between Rhode Island and the United States decreased in the 1990's.

Cervical cancer mortality was slightly lower in RI than the US throughout the 1990s, but this differential decreased over the decade.

Disparities

In Rhode Island, cervical cancer rates are higher among black women than white women.

Paralleling US experience, age-adjusted cervical cancer incidence and mortality rates in RI are higher among black women than white women. Because proper cervical cancer screening is effective in *preventing* cervical cancer by facilitating the removal of precancerous lesions, higher incidence in any group of women reflects inadequate

screening. Higher mortality also reflects inadequate screening, but may also reflect barriers to state-of-the-art therapy.

Status of Control Strategies

The burden of cervical cancer may be reduced by screening women according to guidelines and by assuring state-of-the-art treatment for all cervical cancer patients. Current screening with the Pap test is both inexpensive and effective in finding precancerous lesions, which can be removed before tumors develop. As such, the primary control strategy for cervical cancer in RI is screening for cervical cancer according to national guidelines. Another important control strategy is to assure state-of-the-art treatment for all cancer patients through improvement of basic treatment infrastructure.

Effective screening is likely responsible for low cervical cancer rates in Rhode Island.

The effectiveness of screening with the Pap test is reflected in trends of stage-specific cervical cancer incidence rates, analyzed in previous reports (Review). The low rates of cervical cancer in RI reflect very effective use of an extensive screening system.

The WCSP has helped increase the percentage of Rhode Island women who are screened for cervical cancer.

The Women's Cancer Screening Program (WCSP) aims to increase the percentage of women who receive Pap tests (and mammograms). Based at HEALTH, the WCSP provides free cervical cancer screening services for RI women who are age 50 or older (note the difference with the breast cancer screening age criterion), uninsured or underinsured, and with incomes at or less than 250% of the poverty level.

By the year 2000, almost all cervical cancer case reports in Rhode Island were from American College of Surgeons (ACOS) approved hospitals.

By the year 2000, 9 out of 10 cervical tumors in Rhode Island were staged with American Joint Committee on Cancer (AJCC) methodology.

Cancer Control Priorities for 2004

Reduce the burden of cervical cancer by maintaining current levels of cervical cancer screening.

Maintain current levels of cervical cancer screening by (a) maintaining existing infrastructure, (b) promoting use of the Pap test, and (c) reaching out to uninsured women through the WCSP.

Reduce the burden of cervical cancer by identifying existing barriers to screening.

Identify existing barriers to screening among those women not screened according to guidelines. Conduct a careful analysis of the unscreened population using BRFSS and RI-HIS data. Search for common characteristics that may identify target audiences and effective interventions.

Reduce the burden of cervical cancer by increasing the proportion of cervical cancer patients who receive state-of-the-art treatment.

Begin to eliminate disparities by identifying reasons for disparities in relative mortality between white women and black women.

Identify reasons for disparities in relative mortality between white and black women. Conduct a careful analysis of racial differentials using the Rhode Island Cancer Registry, the Behavioral Risk Factor Surveillance System, the Rhode Island Health Interview Survey, and death certificate data. Investigate variables such as socioeconomic status and stage-specific incidence rates among white and black women.

COLORECTAL CANCER

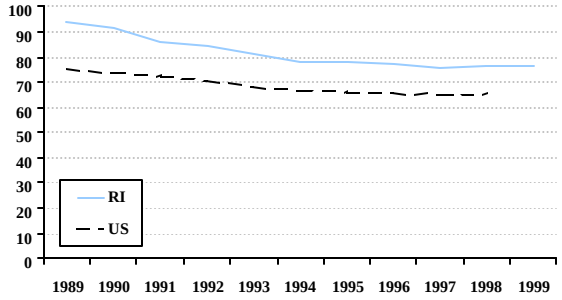
Colorectal cancer starts out as a small, grape-like growth on the lining of either the colon or the rectum (these two body parts make up the large intestine). This growth may become cancerous and form a malignant tumor. (RICAN)

Colorectal cancer is the fourth most commonly diagnosed cancer among Rhode Islanders (annual average of 359 male and 391 female newly diagnosed cases in each of the five years 1997-2001), accounting for 13% of all newly diagnosed cancers in 1997-2001. Colorectal cancer is the second leading cause of cancer death in RI (annual average of 130 male and 149 female deaths in each of the five years 1996-2000), accounting for 11% of all cancer deaths in 1996-2000. In Rhode Island, approximately 4,700 people alive today were diagnosed with colorectal cancer at some point in the past 25 years (2,216 males and 2,476 females in 2000). (RICR)

Cancer Rates

Figure 8-1. Male colorectal cancer incidence by year

Average annual invasive colorectal cancer incidence rates** by year among males, RI and US, 1987-2001***.*



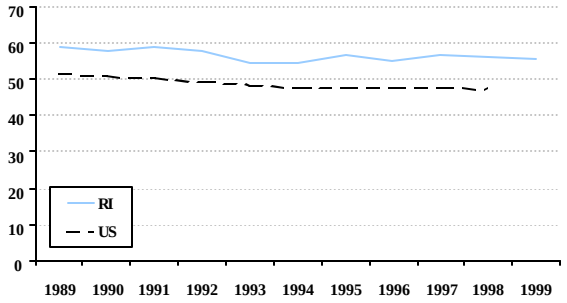
* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are five-year moving averages.
Source: RICR, HEALTH – calculated with *SEER*Stat*; *SEER Cancer Statistics Review, 1973-1999;* 1998 US data is from SEER Public-Use 1973-2000 Data – calculated with *SEER*Stat*.

The age-adjusted incidence of invasive colorectal cancer among RI males of all races decreased from about 94 cases per 100,000 males in 1989 to about 76 cases per 100,000 males in 1999 (based on five-year moving averages). The age-adjusted incidence of invasive colorectal cancer among US males of all races decreased from 75 cases per 100,000 males in 1989 to about 65 cases per 100,000 males in 1998 (based on five-year moving averages). RI colorectal cancer incidence rates for males were higher than US rates throughout the period of observation.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 8-2. Female colorectal cancer incidence by year

Average annual invasive colorectal cancer incidence rates** by year among females, RI and US, 1987-2001***.*



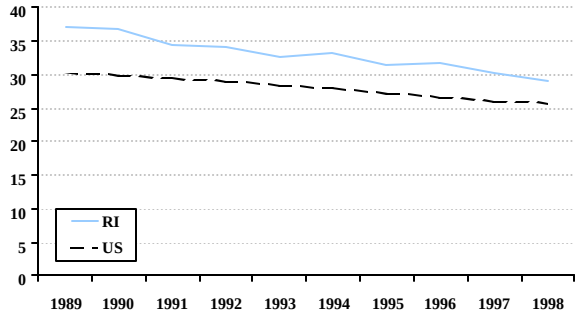
* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are five-year moving averages.
Source: RICR, HEALTH – calculated with *SEER*Stat*; *SEER Cancer Statistics Review, 1973-1999;* 1998 US data is from SEER Public-Use 1973-2000 Data – calculated with *SEER*Stat*.

The age-adjusted incidence of invasive colorectal cancer among RI females of all races from 1989 to 1999 decreased from about 59 cases per 100,000 females to about 55 (based on five-year moving averages). Similarly, the age-adjusted incidence of invasive colorectal cancer among US females of all races decreased from about 52 cases per 100,000 females in 1989 to about 47 cases per 100,000 females in 1998 (based on five-year moving averages). RI colorectal cancer incidence rates for females were higher than US rates throughout the period of observation.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 8-3. Male colorectal cancer mortality by year

Average annual colorectal cancer mortality rates by year among males, RI and US, 1987-2000**.*



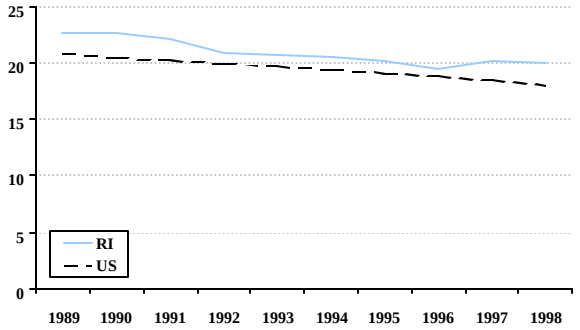
* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are five-year moving averages.
Source: CDC WONDER, CDC; 1998 US data is from SEER US Mortality 1969-2000 Data – calculated with *SEER*Stat*.

The age-adjusted mortality of invasive colorectal cancer among RI males of all races declined from 37 deaths per 100,000 in 1989 to 30 deaths per 100,000 in 1998 (based on five-year moving averages). Similarly, the age-adjusted mortality of invasive colorectal cancer among US males of all races declined from 30 in 1989 to 26 in 1998 (based on five-year moving averages). RI colorectal cancer mortality rates for males were higher than US rates throughout the period of observation.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 8-4. Female colorectal cancer mortality by year

Average annual colorectal cancer mortality rates by year among females, RI and US, 1987-2000**.*



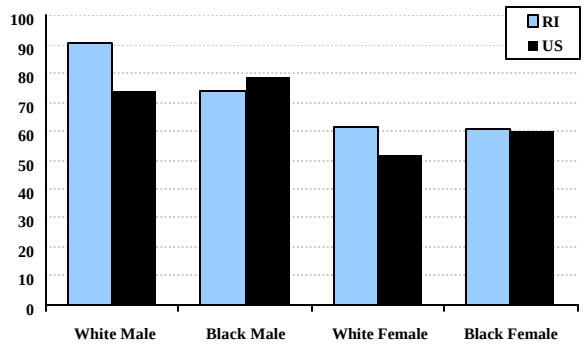
* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are five-year moving averages.
Source: CDC WONDER, CDC; 1998 US data is from SEER US Mortality 1969-2000 Data – calculated with *SEER*Stat*.

The age-adjusted mortality of invasive colorectal cancer among RI females of all races declined from 23 deaths per 100,000 in 1989 to 20 deaths per 100,000 in 1998 (based on five-year moving averages). Similarly, the age-adjusted mortality of invasive colorectal cancer among US females of all races declined from 21 in 1989 to 18 in 1998 (based on five-year moving averages). RI colorectal cancer mortality rates for females were slightly higher than US rates throughout the period of observation.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 8-5. Colorectal cancer incidence by race and sex

Average annual invasive colorectal cancer incidence rates by race and sex, RI and US, 1987-2000.*



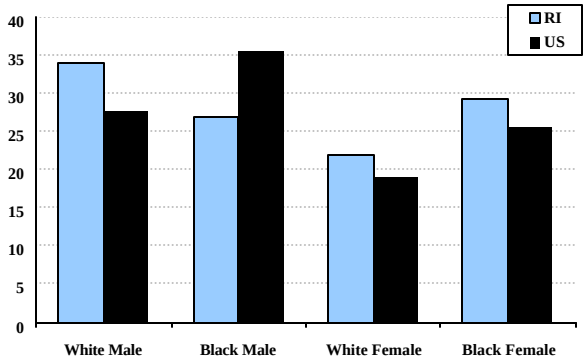
* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

In 1987-2000, colorectal cancer incidence rates in RI were higher among white males (91 cases per 100,000) than black males (74 cases per 100,000). In the US, male rates were slightly higher among blacks. Female colorectal cancer incidence rates during this period were similar among whites and blacks in RI (61 cases per 100,000), and slightly higher among blacks than whites in the US.

[Note: RI incidence data for 2001 is currently available. US incidence data is only available through 2000. For comparability, the figure at left contains RI data through 2000.]

Figure 8-6. Colorectal cancer mortality by race and sex

Average annual colorectal cancer mortality rates by race and sex, RI and US, 1987-2000.*

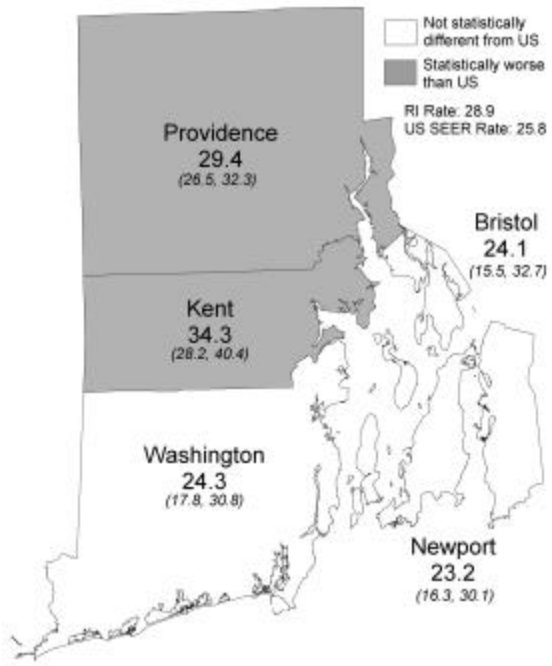


* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

In 1987-2000, colorectal cancer mortality rates in RI were higher among white males (34 deaths per 100,000) than black males (27 deaths per 100,000). In the US, male rates were higher among blacks. Female colorectal cancer mortality rates during this period were higher among black females (29 deaths per 100,000) than white females (22 deaths per 100,000) in RI. The same was true for colorectal cancer mortality rates among US females.

Figure 8-5. Male colorectal cancer mortality by county

Average annual colorectal cancer mortality rates among males by county and statistical difference from US rates, RI, 1996-2000.*

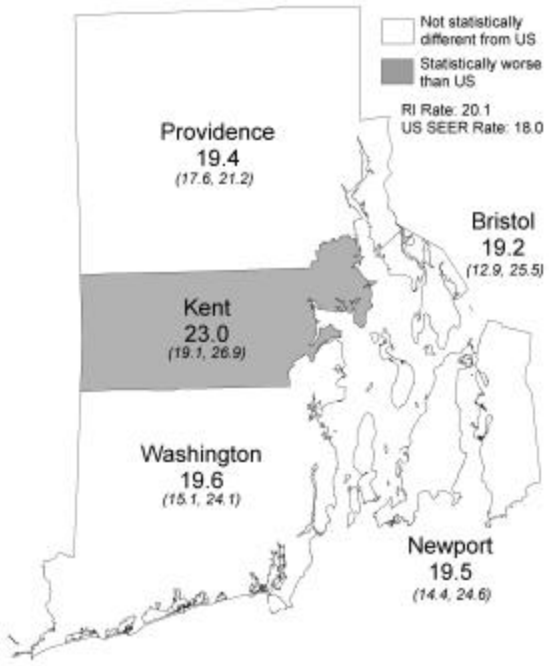


In 1996-2000, average annual colorectal cancer mortality rates among males in Providence county (29 deaths per 100,000) and Kent county (34 deaths per 100,000) were significantly higher than the US rate (26 deaths per 100,000).

[Note: Maps are color-coded based on comparison to US mortality rates. When the US rates fall within the 95% confidence interval (shown in parentheses), it suggests that there is no statistical difference. Please see Key for Maps in **About the Data** (section 3) for a clear delineation of counties.]

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000.
Data source: Office of Vital Records, HEALTH; calculated with *SEER*Stat*.
Map source: HEALTH gis.

Figure 8-6. Female colorectal cancer mortality by county
Average annual colorectal cancer mortality rates among females by county and statistical difference from US rates, RI, 1996-2000.*



In 1996-2000, average annual colorectal cancer mortality rates among females in Kent county (23 deaths per 100,000) were significantly higher than the US rate (18 deaths per 100,000).

[Note: Maps are color-coded based on comparison to US mortality rates. When the US rates fall within the 95% confidence interval (shown in parentheses), it suggests that there is no statistical difference. Please see Key for Maps in **About the Data** (section 3) for a clear delineation of counties.]

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000.
Data source: Office of Vital Records, HEALTH; calculated with *SEER*Stat* .
Map source: HEALTH gis.

Healthy People 2010 **Targets**
Mortality: By 2010, reduce the colorectal cancer death rate to 13.9 deaths per 100,000 population (age-adjusted to the year 2000 standard population of the United States; baseline = 21.2 deaths per 100,000 population in 1998).

Risk Factors

Persons at increased risk for colorectal cancer include those with uncommon familial syndromes (i.e., heredity polyposis and hereditary nonpolyposis colorectal cancer), or longstanding ulcerative colitis. Family history of colorectal cancer, personal history of large adenomatous polyps, personal history of colorectal cancer, and prior diagnosis of endometrial, ovarian, or breast cancer are also associated with increased risk. (Clinical)

Prior to 1999 it was believed that a diet high in fiber helped reduce the incidence of colorectal cancer. "Increasing evidence suggests that diets high in fiber-containing foods are associated with a reduced risk for cancer, especially cancer of the colon." (NIH) In 1999, Harvard Medical School published a landmark study, based on the Nurses' Health Study, which did not support the salutary effects of fiber on the incidence of colorectal cancer. (Fuchs)

Prevention

Although colorectal cancer has been linked to a variety of risk factors, which preventive measures are effective has been questioned. Currently, colorectal cancer screening tests may be the most clinically significant strategy for the prevention of colorectal cancer.

Screening

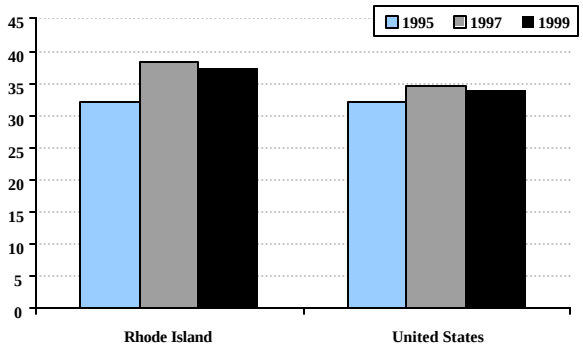
Screening tests for colorectal cancer include sigmoidoscopy, colonoscopy, fecal occult blood test (FOBT), barium enema, and digital rectal examination (DRE). A number of clinical trials have demonstrated the effectiveness of screening for the reduction of colorectal cancer mortality. (HP) A preferred strategy for colorectal cancer screening is early detection with endoscopic tests (sigmoidoscopy or colonoscopy) because of the added advantage that precancerous polyps may be removed during the procedure, thus preventing the development of cancer.

The American Cancer Society recommends (ACS):

- Beginning at age 50, both men and women should follow **one** of the five screening options below:
    - A fecal occult blood test (FOBT) every year (the take-home multiple sample method should be used),
    - A fecal occult blood test every year plus flexible sigmoidoscopy every 5 years,
    - Flexible sigmoidoscopy every 5 years,
    - (Of these first 3 options, the combination of FOBT every year and flexible sigmoidoscopy every 5 years is preferable.)
    - Double-contrast barium enema every 5 years, or
    - Colonoscopy every 10 years.

Figure 8-9. Male colorectal cancer screening by year

Percent of male respondents 40 and older who have ever been screened for colorectal cancer by year, RI and US, 1995-1999.*



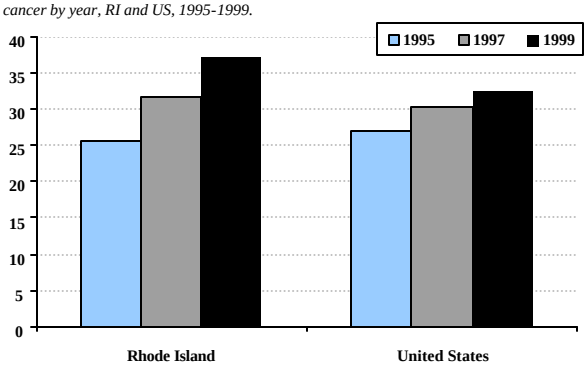
* Type of screening test (proctoscopic exam, sigmoidoscopy, or colonoscopy) differs by year.
Source: RI-BRFSS, HEALTH; BRFSS, CDC.

The proportion of RI males of all ages and races who had ever received some form of colorectal screening exam (sigmoidoscopy, colonoscopy, or proctoscopic exam depending on year of study) increased from 32% in 1995 to 37% in 1999. Among all the states, in comparison, the median proportion of males of all ages and races who had ever been screened for colorectal cancer increased from 32% in 1995 to 34% in 1999.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 8-10. Female colorectal cancer screening by year

Percent of female respondents 40 and older who have ever been screened for colorectal cancer by year, RI and US, 1995-1999.*



* Type of screening test (proctoscopic exam, sigmoidoscopy , or colonoscopy) differs by year.
Source: RI -BRFSS, HEALTH; BRFSS, CDC.

The proportion of RI females of all ages and races who had ever received some form of colorectal screening exam (sigmoidoscopy, colonoscopy, or proctoscopic exam depending on year of study) increased from 26% in 1995 to 37% in 1999. Among all the states, in comparison, the median proportion of females of all ages and races who had ever been screened for colorectal cancer increased from 27% in 1995 to 32% in 1999.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

[Note: Indicators for colorectal screening must be interpreted with caution because they are different for each of the years 1995, 1997, and 1999. Data for 1995 indicate percent population that had ever had a proctoscopic exam. Data for 1997 indicate percent population that had ever had a sigmoidoscopy or proctoscopic exam. Data for 1999 indicate percent population that had ever had a sigmoidoscopy or colonoscopy exam.]

From 1989 to 1999, trends in stage-specific colorectal cancer incidence rates are consistent with screening rates. When broken down by stage of disease at diagnosis, there was an increase of *in situ* colorectal tumors, decrease of local and regional colorectal tumors, and decrease or no significant change in the incidence of distant colorectal tumors or tumors of unknown stage.

***Healthy People 2010* Targets**
Screening: By 2010, increase the proportion of adults aged 50 years and older who have ever received a sigmoidoscopy to 50% (baseline = 37% in 1998). Increase the proportion of adults aged 50 years and older who have received a fecal occult blood test (FOBT) within the preceding two years to 50% (baseline = 35% in 1998).

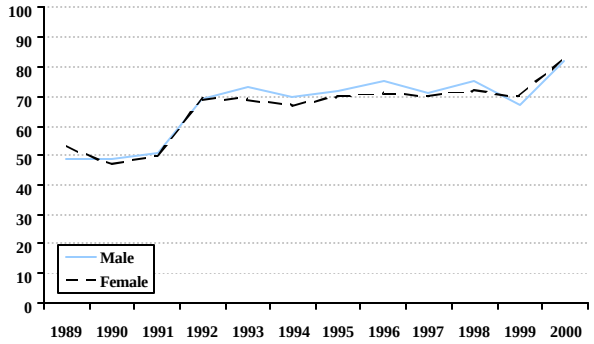
Treatment

Surgical options differ for colon cancer and rectal cancer. However, non-surgical options (radiation and chemotherapy) are the same for both cancers. Surgical treatment options for colon cancer include colonoscopy and surgery. Surgical treatment options for rectal cancer include polypectomy, local excision, local full thickness resection, and electrofulgeration. More advanced stages of rectal cancer may require other types of surgery. A common surgical procedure for advanced stages of rectal cancer is a colostomy. Non-surgical treatment options for colon and rectal cancer include radiation therapy and chemotherapy. (RICAN)

The percent of colorectal cancer cases in RI ACOS-approved treatment programs and the percent staged with AJCC staging methodology is detailed below.

Figure 8-11. Colorectal cancer in ACOS programs by year and sex

Percent of colorectal cancer cases treated in ACOS approved cancer treatment programs by year and sex, RI, 1989-2000.

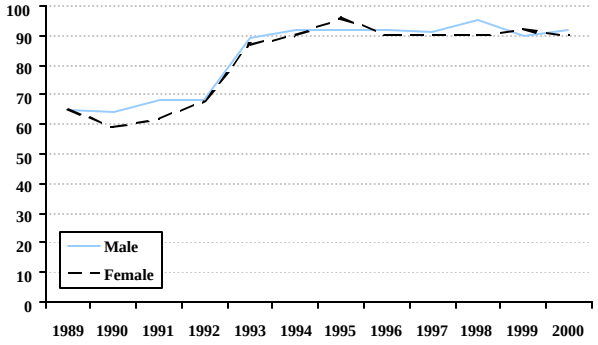


Source: RICR, HEALTH

The percent of colorectal cancer case reports from ACOS approved hospital cancer treatment programs in RI increased from about 50% in 1989 to about 70% in 1992, for both males and females. This proportion varied around 70% until 2000, when it increased to 82% for males and 83% for females.

Figure 8-12. Colorectal cancer with AJCC staging by year and sex

Percent of colorectal cancer cases staged with AJCC staging methodology by year and sex, RI, 1989-2000.

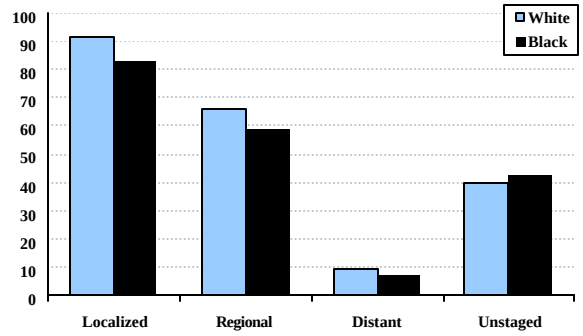


Source: RICR, HEALTH

Prior to a change in the Rules and Regulations of the Rhode Island Cancer Registry in 1992, only about 65% of the colorectal cancer cases newly diagnosed among RI males and females were staged using the AJCC system. After the Rules change, the proportion of cases with AJCC staging increased to 89% among males and 87% among women, and from 1993 through 2000 has averaged 92% and 91% for males and women, respectively.

Survival

Figure 8-13. Male colorectal cancer survival rates by race and stage
Invasive colorectal cancer five-year relative survival rates by race and stage of disease at diagnosis among males, US, 1992-1999.*

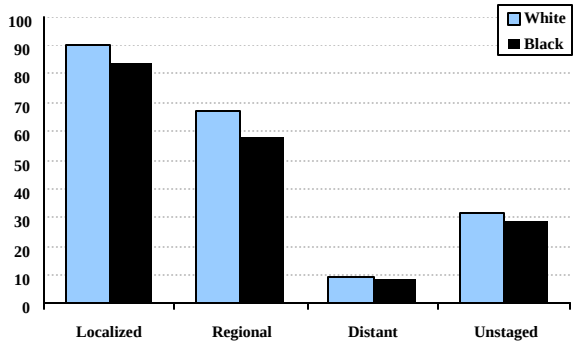


* Survival rates are relative rates expressed as percents.
Source: *SEER Cancer Statistics Review, 1975 -2000.*

Based on US data from 1992-1999, five-year relative survival rates for male colorectal cancer are higher when diagnosed at earlier stages of disease, and are higher among white males than black males. Colorectal cancers diagnosed while localized have a survival rate of 91% among white males and 83% among black males. Cancers that are not diagnosed until a distant stage have a survival rate of 9% among whites and 7% among blacks.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 8-14. Female colorectal cancer survival rates by race and stage
Five year relative invasive colorectal cancer survival rates by race and stage of disease at diagnosis among females, US, 1992-1999.*



* Survival rates are relative rates expressed as percents.
Source: *SEER Cancer Statistics Review, 1975 -2000.*

Based on US data from 1992-1999, five-year relative survival rates for female colorectal cancer are higher when diagnosed at earlier stages of disease, and are higher among white females than black females. Colorectal cancers diagnosed while localized have a survival rate of 90% among white females and 84% among black females. Cancers that are not diagnosed until a distant stage have a survival rate of 10% among whites and 9% among blacks.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Discussion

Summary of Burden

Colorectal cancer contributes substantially to the cancer burden in Rhode Island.

Colorectal cancer is the fourth most commonly diagnosed cancer and the second leading cause of cancer death. Approximately 4,700 Rhode Islanders alive today were diagnosed with colorectal cancer at some point in the past 25 years.

In Rhode Island, the incidence of colorectal cancer declined in the 1990's, probably because of aggressive screening.

This decline is likely due to an increase in colorectal cancer screening, which is effective in finding precancerous lesions that can be removed before they progress into cancer.

Relative Burden

Rhode Islanders have higher colorectal cancer rates than Americans as a whole.

This gap began to narrow in the late 1990's.

Disparities

In Rhode Island, the burden of colorectal cancer is greater among men than women.

This differential began to decrease in the late 1990's.

In Rhode Island, the burden of colorectal cancer is higher among white men than black men.

In 1987-2000, white men in Rhode Island were more likely to be diagnosed with and to die from colorectal cancer than black men. This contrasts with the United States experience where the opposite was true.

The burden of colorectal cancer is greater in Kent and Providence counties than in the nation as a whole.

High colorectal cancer mortality rates may indicate a lag in endoscopic screening in Kent and Providence counties, and is worthy of further study to test this and other possible reasons for the differential.

Status of Control Strategies

The burden of colorectal cancer may be reduced by screening persons according to guidelines and by assuring state-of-the-art treatment for all colorectal cancer patients. Endoscopic colorectal cancer screening tests, much like screening tests for cervical cancer, find precancerous lesions that can be removed before they progress into cancer, and thus are effective preventives. Another important control strategy is to assure state-of-the-art treatment for all cancer patients through improvement of basic treatment infrastructure.

In Rhode Island, the proportion of persons screened for colorectal cancer increased in the 1990's, but is still low.

From 1995 to 1999, Rhode Island edged ahead of the United States in the proportions of people ages 40 and over ever screened for colorectal cancer. Despite this progress, considerable work is needed to reach the 63% of RI men and women who have never been screened for colorectal cancer.

In Rhode Island, screening with endoscopy is likely responsible for the decrease in colorectal cancer incidence.

Increased use of endoscopy for colorectal cancer screening is likely responsible for the recent decrease in colorectal cancer incidence. The effectiveness of colorectal cancer screening is reflected in trends of stage-specific colorectal cancer incidence rates, analyzed in previous reports (Review). Over the course of the 1990's in RI, the incidence of *in situ* colorectal tumors increased, while the incidence of local and regional colorectal tumors decreased, signs of effective screening.

By the year 2000, 8 out of 10 colorectal cancer case reports in Rhode Island were from American College of Surgeons (ACOS) approved hospitals.

By the year 2000, 9 out of 10 colorectal tumors in Rhode Island were staged with American Joint Committee on Cancer (AJCC) methodology.

Cancer Control Priorities for 2004

Reduce the burden of colorectal cancer by increasing the proportion of Rhode Islanders screened for colorectal cancer according to guidelines.

Increase the proportion of Rhode Islanders screened for colorectal cancer according to guidelines by (a) promoting awareness of major risk factors such as family history and (b) promoting use of screening tests, especially colonoscopy, throughout the population, as current screening rates are low.

Reduce the burden of colorectal cancer by increasing the proportion of colorectal cancer patients who receive state-of-the-art treatment.

Begin to eliminate disparities by identifying reasons for disparities in relative mortality.

Identify reasons for disparities in relative mortality such as differences in screening and treatment. Conduct a careful analysis of gender, race, and geographic differentials using the Rhode Island Cancer Registry, the Behavioral Risk Factor Surveillance System, the Rhode Island Health Interview Survey, and death certificate data.

LUNG CANCER

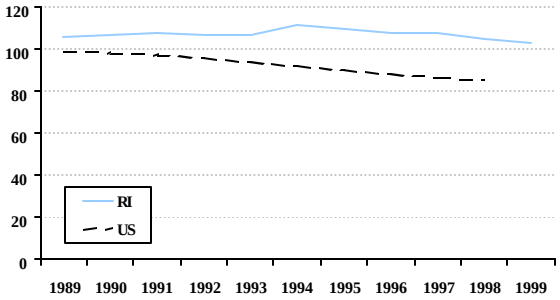
Lung cancer originates in the tissues of the lungs. Most cases of lung cancer can be described by one of two separate categories: small cell lung cancer and non-small cell lung cancer. Small cell lung cancer (about 20% of lung cancer cases), as the name implies, deals with the type of lung cancer with cells that are smaller than the average cancer cell. These small cells rapidly reproduce to form large tumors that can spread to other parts of the body. This type of lung cancer is often associated with smoking or secondhand smoke. The most common type of lung cancer is the slower-growing non-small cell lung cancer (nearly 80% of all cases). This category of lung cancer can be further divided into three subcategories: squamous cell carcinoma, adenocarcinoma, and large cell carcinomas. (RICAN)

Lung cancer is the second most commonly diagnosed cancer among Rhode Islanders (annual average of 490 male and 397 female newly diagnosed cases in each of the five years 1997-2001), accounting for 15% of all newly diagnosed cancers in 1997-2001. Lung cancer is the leading cause of cancer death in RI (annual average of 403 male and 300 female deaths in each of the five years 1996-2000), accounting for 29% of all cancer deaths in 1996-2000. In Rhode Island, approximately 1,500 people alive today were diagnosed with lung cancer at some point in the past 25 years (750 males and 826 females in 2000). (RICR)

Cancer Rates

Figure 9-1. Male lung cancer incidence by year

Average annual invasive lung cancer incidence rates** by year among males, RI and US, 1987-2001***.*



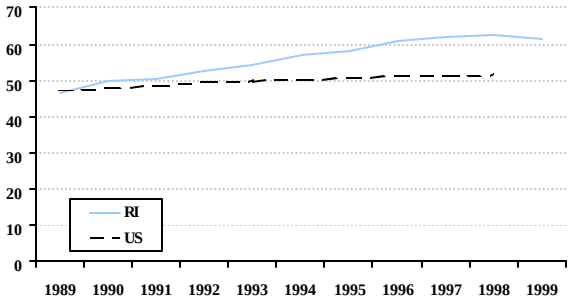
* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are five-year moving averages.
Source: RICR, HEALTH – calculated with *SEER*Stat; SEER Cancer Statistics Review 1973-1999;* 1999 US data is from SEER Public-Use 1973-2000 Data – calculated with *Seer*Stat.*

The age-adjusted incidence of invasive lung cancer among RI males of all races increased from 105 cases per 100,000 males in 1989 to 111 cases per 100,000 males in 1994, followed by a decrease to 102 cases per 100,000 males in 1999 (based on five-year moving averages). In contrast, the age-adjusted incidence of invasive lung cancer among US males of all races decreased from about 99 cases per 100,000 males in 1989 to about 85 cases per 100,000 males in 1998 (based on five-year moving averages).

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 9-2. Female lung cancer incidence by year

Average annual invasive lung cancer incidence rates** by year among females, RI and US, 1987-2001***.*



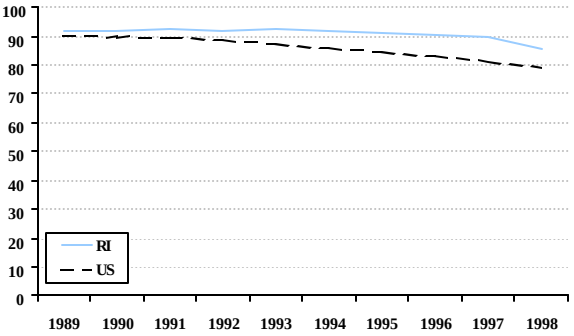
* Invasive includes the following stages of disease at diagnosis local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are five-year moving averages.
Source: RICR, HEALTH – calculated with *SEER*Stat*; *SEER Cancer Statistics Review 1973-1999;* 1999 US data is from SEER Public-Use 1973-2000 Data – calculated with *Seer*Stat*.

The age-adjusted incidence of invasive lung cancer among RI females of all races increased from 46 cases per 100,000 females in 1989 to 61 cases per 100,000 females in 1999 (based on five-year moving averages). Similarly, the age-adjusted incidence of invasive lung cancer among US females of all races increased from 47 cases per 100,000 females in 1989 to 52 cases per 100,000 females in 1998 (based on five-year moving averages).

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 9-3. Male lung cancer mortality by year

Average annual lung cancer mortality rates by year among males, RI and US, 1987-2000**.*



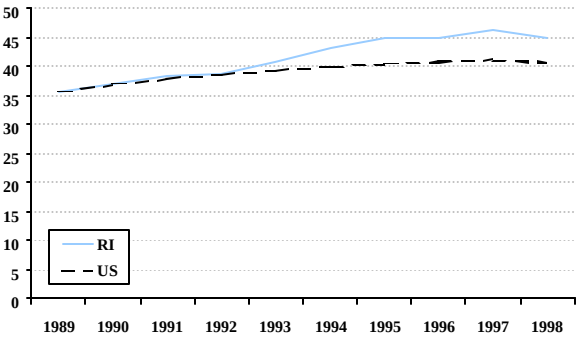
* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are five-year moving averages.
Source: CDC WONDER, CDC; 1998 US data from SEER US Mortality 1969-2000 Data – calculated with *SEER*Stat*.

The age-adjusted mortality of invasive lung cancer among RI males of all races was 92 deaths per 100,000 in 1989 and 86 deaths per 100,000 in 1998 (based on five-year moving averages). This may suggest an initial decline in lung cancer mortality rates among RI men. The age-adjusted mortality of invasive lung cancer among US males of all races declined from 90 in 1989 to 80 in 1998 (based on five-year moving averages).

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 9-4. Female lung cancer mortality by year

Average annual lung cancer mortality rates by year among females, RI and US, 1987-2000**.*



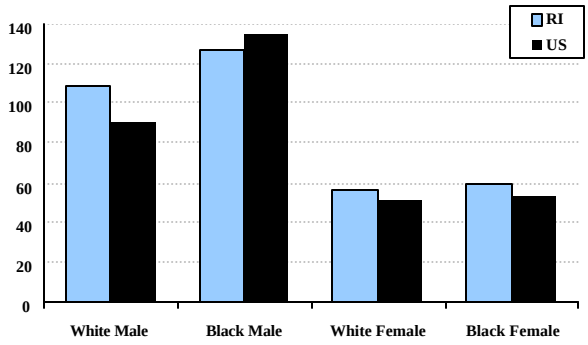
* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are five-year moving averages.
Source: CDC WONDER, CDC; 1998 US data from SEER US Mortality 1969-2000 Data – calculated with *SEER*Stat*.

The age-adjusted mortality of invasive lung cancer among RI females of all races increased from 36 deaths per 100,000 in 1989 to 45 deaths per 100,000 in 1998 (based on five-year moving averages). Similarly, the age-adjusted mortality of invasive lung cancer among US females of all races increased from 36 in 1989 to 41 in 1998 (based on five-year moving averages).

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 9-5. Lung cancer incidence by race and sex

Average annual invasive lung cancer incidence rates by race and sex, RI and US, 1987-2000.*



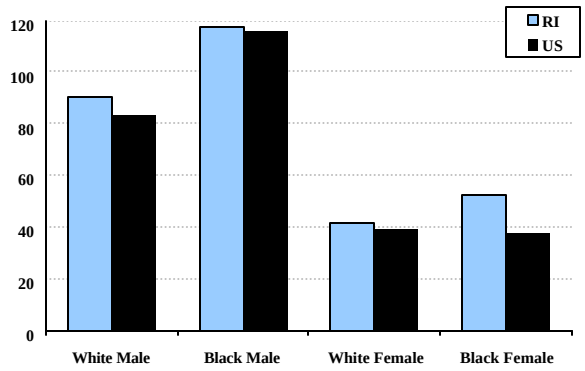
* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

In 1987-2000, lung cancer incidence rates in RI were higher among black males (127 cases per 100,000) than white males (108 cases per 100,000). US male rates were also higher among black males. Female lung cancer incidence rates during this period were slightly higher among black female (59 cases per 100,000) than white females (56 cases per 100,000), and the same was true among US females.

[Note: RI incidence data for 2001 is currently available. US incidence data is only available through 2000. For comparability, the figure at left contains RI data through 2000.]

Figure 9-6. Lung cancer mortality by race and sex

Average annual lung cancer mortality rates by race and sex, RI and US, 1987-2000.*

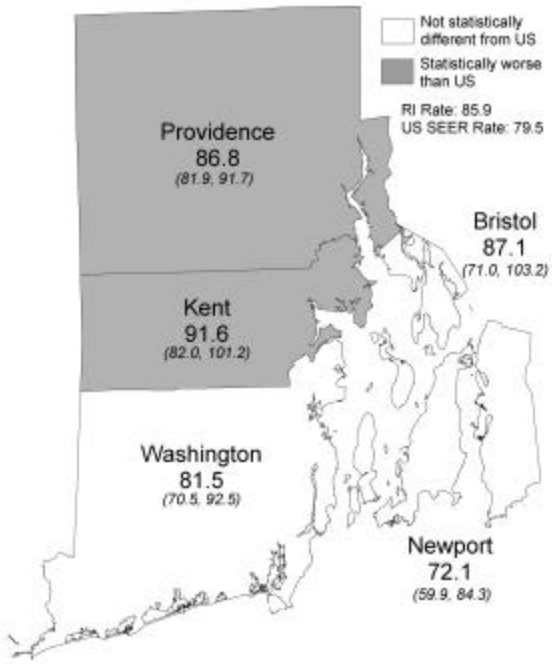


* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

In 1987-2000, lung cancer mortality rates in RI were higher among black males (118 deaths per 100,000) than white males (90 deaths per 100,000). US male rates were also higher among blacks. Female lung cancer mortality rates during this period were higher among black females (63 deaths per 100,000) than white females (42 deaths per 100,000) in RI. US lung cancer mortality rates were similar for white and black females.

Figure 9-5. Male lung cancer mortality by county

Average annual lung cancer mortality rates among males by county and statistical difference from US rates, RI, 1996-2000.*



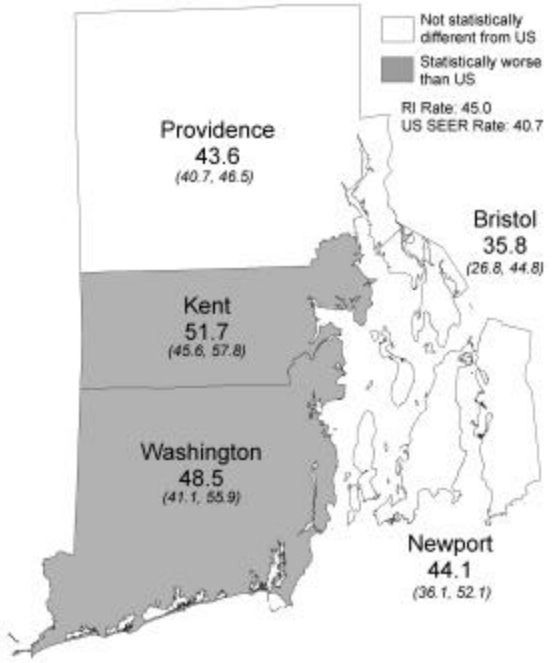
In 1996-2000, average annual lung cancer mortality rates among males in Providence county (87 deaths per 100,000) and Kent county (92 deaths per 100,000) were significantly higher than the US rate. (80 deaths per 100,000)

[Note: Maps are color-coded based on comparison to US mortality rates. When the US rates fall within the 95% confidence interval (shown in parentheses), it suggests that there is no statistical difference. Please see Key for Maps in **About the Data** (section 3) for a clear delineation of counties.]

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000.
Data source: Office of Vital Records, HEALTH; calculated with *SEER*Stat* .
Map source: HEALTH gis.

Figure 9-6. Female lung cancer mortality by county

Average annual lung cancer mortality rates among females by county and statistical difference from US rates, RI, 1996-2000.*



In 1996-2000, average annual lung cancer mortality rates among females in Kent county (52 deaths per 100,000) and Washington county (49 deaths per 100,000) were significantly higher than the US rate (41 deaths per 100,000).

[Note: Maps are color-coded based on comparison to US mortality rates. When the US rates fall within the 95% confidence interval (shown in parentheses), it suggests that there is no statistical difference. Please see Key for Maps in **About the Data** (section 3) for a clear delineation of counties.]

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000.
Data source: Office of Vital Records, HEALTH; calculated with *SEER*Stat* .
Map source: HEALTH gis.

Healthy People 2010 **Targets**
Mortality: By 2010, reduce the lung cancer death rate to 44.9 deaths per 100,000 population (age-adjusted to the year 2000 standard population of the United States; baseline = 57.6 deaths per 100,000 population in 1998).

Risk Factors

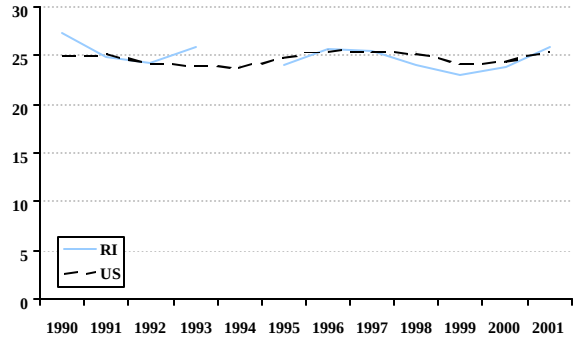
In 1964, the first Surgeon General's Report on Smoking and Health recognized cigarette smoking as a cause of cancer. (Smoking) Since that time, more than 20 Surgeon General's reports (NIH) and countless studies have confirmed that both cigarette smoking and exposure to environmental tobacco smoke cause lung cancer. (HP) In fact, 87% of lung, trachea, and bronchus cancers are associated with tobacco use. (Clinical) Certain environmental carcinogen exposures are also important risk factors for lung cancer.

Prevention

Lung cancer is a preventable cause of death, and with no effective screening procedures or treatments, the reduction of tobacco use is crucial. (HP) The American Cancer Society suggests that the best way to prevent lung cancer is to not smoke and to avoid people who do. (ACS) If you already smoke, you should quit. You should also avoid breathing in other people's smoke. Clinicians should advise all patients to avoid tobacco smoke. (Clinical)

Figure 9-9. Male current smokers by year

Percent of male respondents 18 and older who have ever smoked 100 cigarettes in their lifetime and reported smoking every day or some days by year, RI and US, 1990-2001.



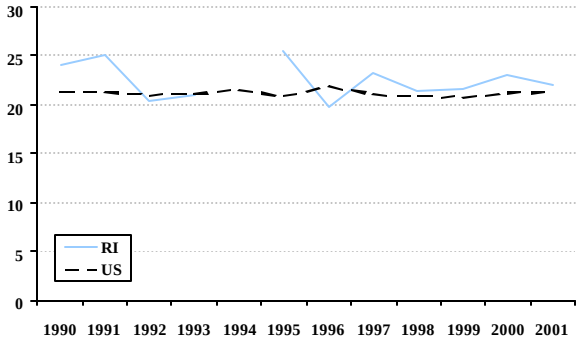
Source: RI -BRFSS, HEALTH; BRFSS, CDC

From 1990 through 2000, the proportion of RI males who had reported being a current smoker varied between 23% and 27%, showing no definite trend. The median proportion of US males who had reported being a current smoker remained at around 25% for the entire period of observation.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 9-10. Female current smokers by year

Percent of female respondents 18 and older who have ever smoked 100 cigarettes in their lifetime and reported smoking every day or some days by year, RI and US, 1990-2001.



Source: RI-BRFSS, HEALTH; BRFSS, CDC

From 1990 through 2001, the percent of RI females who had reported being a current smoker varied between 20% and 25%. Among all the states, in comparison, the median proportion of US females who reported being a current smoker hovered around 21%.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

***Healthy People 2010* Targets**
Current Smokers: By 2010, reduce cigarette smoking by adults aged 18 years and over to 12% (baseline = 24% in 1998), and reduce tobacco use by students in grade 9 through 12 to 21% (baseline = 40% in 1998).

Screening

Some studies find that lung cancer caught early is more responsive to treatment. For this reason, the use of x-ray and CAT scan has been debated and is being studied. However, according to clinical guidelines, "Routine screening for lung cancer with chest radiography or sputum cytology in asymptomatic persons is not recommended." (Clinical) Because systematic screening for lung cancer is not recommended in the US, nor is practiced in RI, we would not expect trends in stage of disease at diagnosis to reflect this.

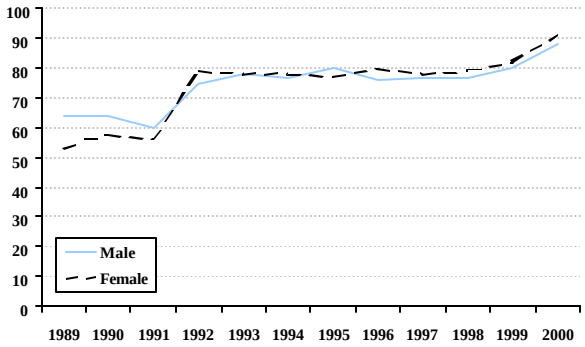
Treatment

Lung cancer is difficult to treat. It is often not discovered until the later stages of the disease, and therefore, has often progressed too far to have it all removed. Surgery is usually used to treat non-small cell lung cancer, while other treatment options are usually used for small cell lung cancer. Surgical options for lung cancer include segmental resection, lobectomy, or pneumonectomy. Respectively, these procedures remove a section of the lung, a lobe of the lung, or an entire lung. Non-surgical treatment options for lung cancer include chemotherapy, radiation therapy, photodynamic therapy (PDT; chemical injection followed by laser treatment), or clinical trials. (RICAN)

The percent of lung cancer cases in RI ACOS-approved treatment programs and the percent staged with AJCC staging methodology is detailed below.

Figure 9-11. Lung cancer in ACOS programs by year and sex

Percent of lung cancer cases treated in ACOS approved cancer treatment programs by year and sex, RI, 1989-2000.

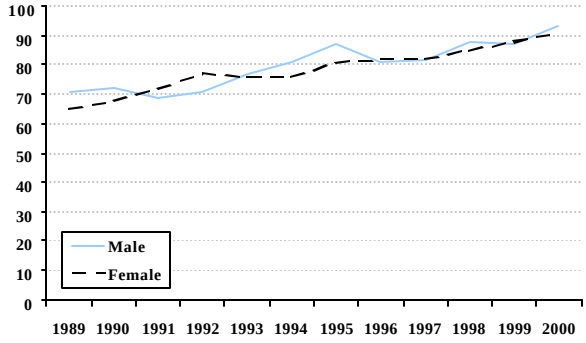


Source: RICR, HEALTH

The percent of lung cancer case reports from ACOS approved hospital cancer treatment programs in RI was in the 60s among males and in the 50s among females from 1989 to 1991. In 1992, this proportion increased to just below 80% for both males and females, and remained there until it increased in 2000 to 88% for males and 91% for females.

Figure 9-12. Lung cancer with AJCC staging by year and sex

Percent of lung cancer cases staged with AJCC staging methodology by year and sex, RI, 1989-2000.



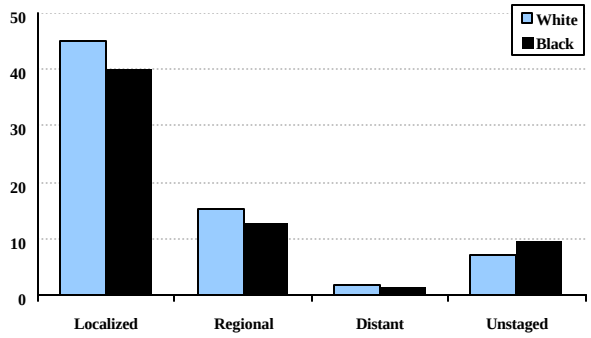
Source: RICR, HEALTH

From 1989 to 2000, the percent of newly diagnosed lung cancer cases staged using the AJCC system, steadily increased from 71% to 93% for men, and from 65% to 91% for women.

Survival

Figure 9-13. Male lung cancer survival rates by race and stage

Five year relative invasive lung cancer survival rates by race and stage of disease at diagnosis among males, US, 1992-1999.*



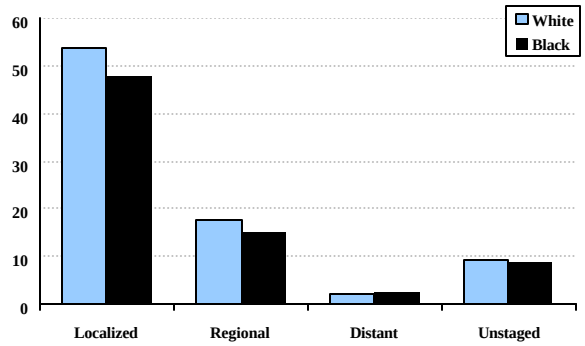
* Survival rates are relative rates expressed as percents
Source: *SEER Cancer Statistics Review, 1975 -2000.*

Based on US data from 1992-1999, five-year relative survival rates for male lung cancer are higher when diagnosed at earlier stages of disease, and are generally slightly higher among white males than black males. Lung cancers diagnosed while localized have a survival rate of 45% among white males and 40% among black males. Cancers that are not diagnosed until a distant stage have a survival rate of 2% among both white and black males.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 9-14. Female lung cancer survival rates by race and stage

Five year relative invasive lung cancer survival rates by race and stage of disease at diagnosis among females, US, 1992-1999.*



* Survival rates are relative rates expressed as percents
Source: *SEER Cancer Statistics Review, 1975 -2000.*

Based on US data from 1992-1999, five-year relative survival rates for female lung cancer are higher when diagnosed at earlier stages of disease, and are generally slightly higher among white females than black females. Lung cancers diagnosed while localized have a survival rate of 54% among white females and 48% among black females. Cancers that are not diagnosed until a distant stage have a survival rate of 2% among both white and black females.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Discussion

Summary of Burden

Lung cancer contributes substantially to the cancer burden in Rhode Island.

Lung cancer is the second most commonly diagnosed cancer and the leading cause of cancer death. Approximately 1,500 Rhode Islanders alive today were diagnosed with lung cancer at some point in the past 25 years.

In Rhode Island, lung cancer mortality decreased among men and increased among women in the 1990's.

These changes reflect smoking trends of past decades.

Relative Burden

In the 1990's, the burden of lung cancer in Rhode Island surpassed that of the nation as a whole.

Among men, lung cancer rates decreased faster at the national level than in Rhode Island, creating a differential. Among women, lung cancer rates increased faster in Rhode Island relative to United States, creating a differential.

Disparities

In Rhode Island, black men were more likely to be diagnosed with lung cancer than white men in the 1990's.

At the national level, this racial disparity was considerably larger.

Among persons diagnosed with lung cancer in Rhode Island, black persons were more likely to die from the disease than white persons in the 1990's.

Kent, Providence, and Washington counties bear a greater burden of lung cancer than the nation as a whole.

Higher lung cancer mortality likely indicates higher rates of smoking or exposure to smoke in these areas, and is worthy of further study to test this and other possible reasons for the differential.

Status of Control Strategies

The burden of lung cancer may be lessened by reducing tobacco use, by reducing exposure to second-hand smoke, and by assuring state-of-the-art treatment for all lung cancer patients. Over the past forty years, more than 20 Surgeon General's reports (NIH) and countless studies have confirmed that both cigarette smoking and environmental tobacco smoke cause lung cancer. Lung cancer is a preventable cause of death, and with no effective screening procedures or treatments, the reduction of tobacco use is crucial. (HP) As such, a primary control strategy for lung cancer in RI is to reduce the proportion of current smokers and to reduce exposure to second-hand smoke. This presents a challenge because heavy advertisement from economically powerful companies continues to attract new consumers, and the drug's highly addictive nature makes smoking cessation difficult. Another important control strategy is to assure state-of-the-art treatment for all cancer patients through improvement of basic treatment infrastructure.

The Tobacco Control Program has worked to reduce the proportion of Rhode Islanders who currently smoke and to reduce exposure to environmental tobacco smoke.

Based at HEALTH, the Rhode Island Tobacco Control Program aims to prevent tobacco use among youth, promote smoking cessation, eliminate environmental tobacco smoke, and eliminate tobacco use disparities. Increasing cigarette tax and restricting youth access to tobacco are notable achievements. However, more needs to be done to reduce exposure to environmental tobacco smoke and to increase tobacco program funding.

By the year 2000, 9 out of 10 lung cancer case reports in Rhode Island were from American College of Surgeons (ACOS) approved hospitals.

By the year 2000, 9 out of 10 lung cancer tumors in Rhode Island were staged with American Joint Committee on Cancer (AJCC) methodology.

Cancer Control Priorities for 2004

Reduce the burden of lung cancer by reducing the proportion of people who are current smokers and by reducing exposure to second-hand smoke.

Reduce the proportion of Rhode Islanders who are current smokers and reduce exposure to second-hand smoke by supporting the Tobacco Control Program in (a) preventing tobacco use among youth, (b) promoting tobacco cessation, and (c) eliminating environmental tobacco use.

Reduce the burden of lung cancer by increasing the proportion of lung cancer patients who receive state-of-the-art treatment.

Monitor the literature on the effectiveness of lung cancer screening.

Ongoing studies may help decide whether or not lung cancer screening reduces the burden of this disease.

Begin to eliminate disparities by identifying reasons for disparities in relative mortality.

Identify reasons for racial and geographic disparities in relative mortality, using data from the Rhode Island Cancer Registry, the Behavioral Risk Factor Surveillance System, the Rhode Island Health Interview Survey, and death certificate data. Address racial disparities in Rhode Island lung cancer incidence and mortality that are not present at the national level.

MELANOMA OF SKIN

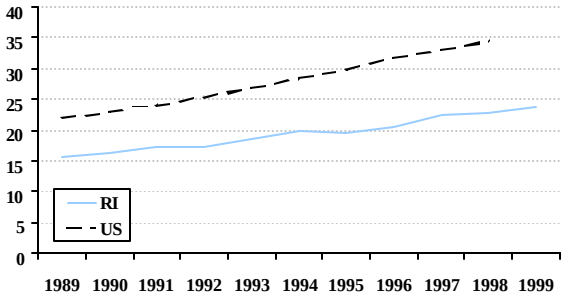
Skin cancer originates in the layers of the skin (epidermis, dermis, and fatty connective tissue). Three types of skin cancer exist: basal cell carcinoma, squamous cell carcinoma, and melanoma. Melanoma develops with the uncontrollable growth of clusters of abnormal melanocytes (skin cells). It is the most harmful type of skin cancer and can spread to nearby tissue if left untreated. Sometimes it can even spread further to other areas of the body. Most moles are normal and not cancerous, however, sometimes the cells of moles become cancerous and form melanoma. (RICAN)

Melanoma of skin is not among the most prevalent cancers in the state (and the nation), but it is significant for cancer control efforts, because of protective behaviors known to reduce the risk of skin cancer. Among Rhode Islanders, melanoma of skin accounted for 3% of all newly diagnosed cancers in 1997-2001, with an annual average of 114 male and 83 female newly diagnosed cases in each of the five years 1997-2001. Melanoma of skin accounted for just over 1% of all cancer deaths in 1996-2000, with an annual average of 15 male and 16 female deaths in each of the five years 1996-2000. In Rhode Island, approximately 2,200 people alive today were diagnosed with melanoma of skin at some point in the past 25 years (1,109 males and 1,123 females in 2000). (RICR)

Cancer Rates

Figure 10-1. Male melanoma of skin incidence by year

Average annual invasive melanoma of skin incidence rates** by year among males, RI and US, 1987-2001***.*



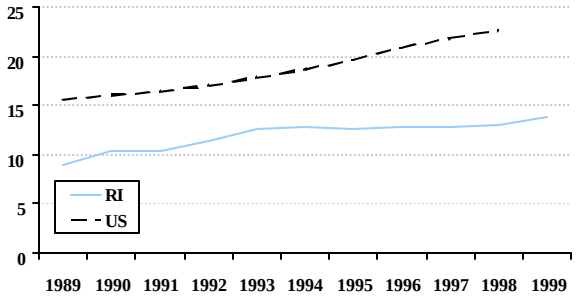
* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are five-year moving averages.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

The age-adjusted incidence of invasive melanoma of skin among RI males of all races increased from 15.4 cases per 100,000 males in 1989 to 23.8 in 1999 (based on five-year moving averages). Similarly, the age-adjusted incidence of invasive melanoma of skin among US males of all races increased from 21.9 cases per 100,000 males in 1989 to 34.5 in 1998 (based on five-year moving averages). US melanoma of skin incidence rates for males were higher than RI rates throughout the period of observation.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 10-2. Female melanoma of skin incidence by year

Average annual invasive melanoma of skin incidence rates** by year among females, RI and US, 1987-2001***.*



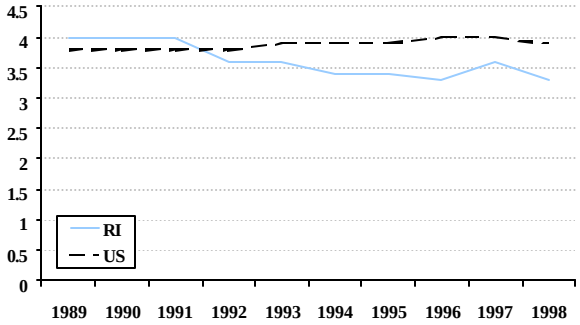
* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are five-year moving averages.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

The age-adjusted incidence of invasive melanoma of skin among RI females of all races increased from 8.9 cases per 100,000 females in 1989 to 13.8 in 1999 (based on five-year moving averages). Similarly, the age-adjusted incidence of invasive melanoma of skin among US females of all races increased from 15.7 cases per 100,000 females in 1989 to 22.6 in 1998 (based on five-year moving averages). US melanoma of skin incidence rates for females were higher than RI rates throughout the period of observation.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 10-3. Male melanoma of skin mortality by year

Average annual melanoma of skin mortality rates by year among males, RI and US, 1987-2000**.*



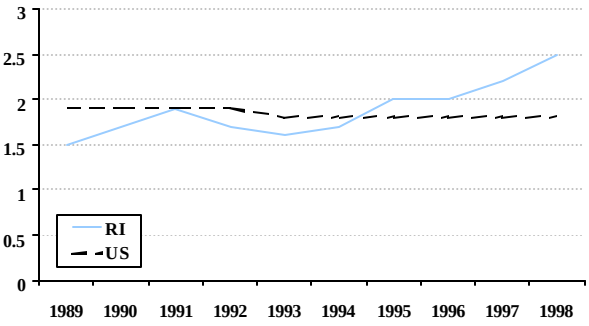
* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are five-year moving averages.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

From 1989 to 1998, the age-adjusted mortality of invasive melanoma of skin among RI males of all races varied between 3 and 4 deaths per 100,000 males (based on five-year moving averages). The age-adjusted mortality of invasive melanoma of skin among US males of all races hovered around 4 deaths per 100,000 for the entire period of observation (based on five-year moving averages).

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 10-4. Female melanoma of skin mortality by year

Average annual melanoma of skin mortality rates by year among females, RI and US, 1987-2000**.*



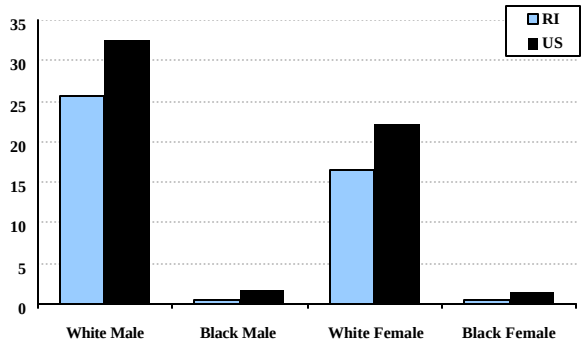
* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are five-year moving averages.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

The age-adjusted mortality of invasive melanoma of skin among RI females of all races was 1.5 deaths per 100,000 in 1989 and was 2.5 deaths per 100,000 in 1998 (based on five-year moving averages). This may suggest an increase in melanoma of skin among RI females. The age-adjusted mortality of invasive melanoma of skin among US females of all races hovered around 2 deaths per 100,000 for the entire period of observation (based on five-year moving averages).

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 10-5. Melanoma of skin incidence by race and sex

Average annual invasive melanoma of skin incidence rates by race and sex, RI and US, 1987-2000.*



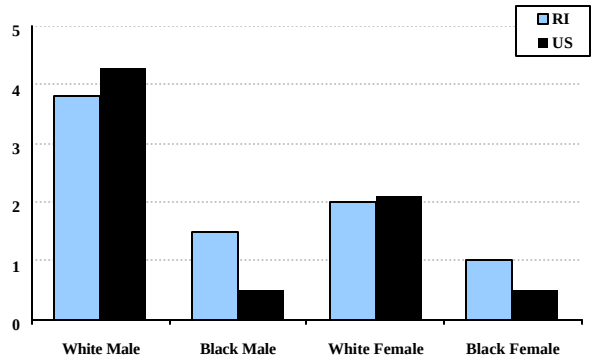
* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

In 1987-2000, melanoma of skin incidence rates in RI were dramatically higher among white males (26 cases per 100,000) than black males (0 cases per 100,000). US male rates were also higher among white males. Female melanoma of skin incidence rates during this period were dramatically higher among white females (17 cases per 100,000) than black females (1 case per 100,000) in RI. This was also true of US females rates.

[Note: RI incidence data for 2001 is currently available. US incidence data is only available through 2000. For comparability, the figure at left contains RI data through 2000.]

Figure 10-6. Melanoma of skin mortality by race and sex

Average annual melanoma of skin mortality rates by race and sex, RI and US, 1987-2000.*



* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

In 1987-2000, melanoma of skin mortality rates in RI were higher among white males (4 deaths per 100,000) than black males (2 deaths per 100,000). US male rates were also higher among white males. Female melanoma of skin mortality rates during this period were higher among white females (2 deaths per 100,000) than black females (1 deaths per 100,000) in R. The same was true for melanoma of skin mortality rates among US females.

***Healthy People 2010* Targets**
Mortality: By 2010, reduce the rate of melanoma cancer deaths to 2.5 deaths per 100,000 population (age-adjusted to the year 2000 standard population of the United States; baseline = 2.8 deaths per 100,000 population in 1998).

Risk Factors

Common risk factors for melanoma of skin include white race, mole characteristics (type and number), family or personal history of skin cancer (particularly melanoma), and immunosuppression. (Clinical) Persons with excessive exposure to sunlight, severe sunburns in childhood, and fair skin may be at increased risk. (Clinical, NIH) An association between melanoma mortality and latitude has also been suggested. (NIH)

Prevention

Exposure to the sun is important for healthy living. However, too much exposure to the sun's ultraviolet rays can cause premature aging, wrinkles, and skin cancer. Factors that influence the intensity of the sun's rays include time of day, season, altitude, global location, and length of time spent in the sun. (Cancercare) Exposure to ultraviolet light also occurs from artificial sources such as tanning booths and sun lamps. Limiting sun exposure and preventing sunburn may help protect against melanoma.

The American Cancer Society recommends (ACS):

- The most important ways to lower your risk of melanoma are to avoid being outdoors in intense sunlight too long and to practice sun safety when you are outdoors even on cloudy or cool days. You can maintain your level of outdoor physical activity and protect your skin at the same time. Practicing sun safety includes:
    - Seeking shade – avoid being outdoors in sunlight too long
    - Protecting your skin with clothing
    - Using sunscreen – SPF of 15 or more
    - Wearing sunglasses – wrap-around sunglasses with 99% to 100% UV absorption
    - Avoiding other sources of UV light – avoid tanning beds and sun lamps
    - Protecting children from the sun
    - Identifying abnormal moles and having them removed
    - Learning more about skin cancer prevention
    - Getting genetic counseling – If several members of one side of your family have had melanoma, if you have had multiple melanomas, or if you have had melanoma at young age or have dysplastic nevi, you may have a gene mutation causing melanoma and should talk to your doctor about genetic counseling.

Clinicians should advise patients to protect their skin from exposure to sunlight. (Clinical)

Healthy People 2010 **Targets**
Prevention: By 2010, increase the proportion of adults aged 18 years and older who follow protective measures (avoid the sun between 10 a.m. and 4 p.m., wear sun-protective clothing when exposed to sunlight, use sunscreen with a sun-protective factor (SPF) of 15 or higher, and avoid artificial sources of ultraviolet light) that may reduce the risk of skin cancer to at least 75% (age-adjusted to the year 2000 standard population of the United States; baseline = 47% of adults aged 18 years and older regularly used one protective measure in 1998).

Screening

Screening for skin cancer involves total-body physical examination of the skin. Systematic use of this process is controversial. The USPSTF concludes, "evidence is insufficient to recommend for or against routine screening for skin cancer using a total-body skin examination." (Clinical) However, other organizations support the practice of regular screening examinations, particularly in persons at high-risk for skin cancer.

The American Cancer Society recommends (ACS):

- A monthly skin self-exam
- That your routine health exam include a skin examination for cancer

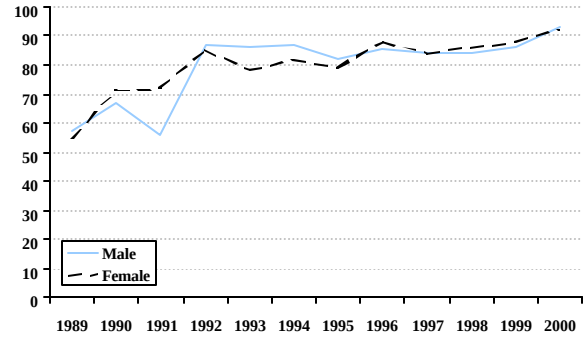
Treatment

Melanomas are almost always removed with surgery. Common surgical treatment options include: simple excision, wide excision (or re-excision), or lymph node dissection. Non-surgical treatment options are not the primary methods for treatment of melanoma, however chemotherapy, radiation therapy, or biological therapy may be used. (RICAN)

The percent of melanoma of skin cases in RI ACOS-approved treatment programs and the percent staged with AJCC staging methodology is detailed below.

Figure 10-7. Melanoma of skin in ACOS programs by year and sex

Percent of melanoma of skin cases that were or are treated in ACOS approved cancer treatment programs by year and sex, RI, 1989-2000.

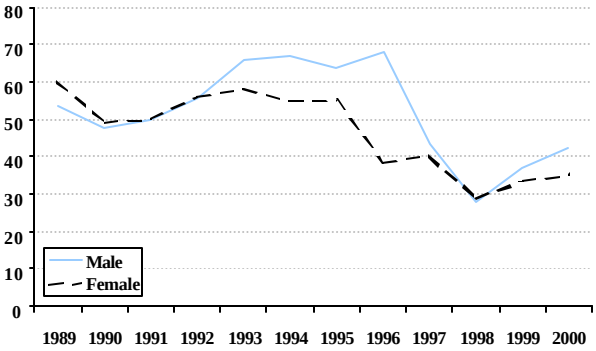


Source: RICR, HEALTH

The percent of melanoma of skin case reports among males from ACOS approved hospital cancer treatment programs in RI averaged 60% in 1989-1991, varied around 85% from 1992 to 1999, and then increased to 93% in 2000. Among females, this proportion increased from 55% in 1989 to 72% in 1991, varied from 78-88% in 1992-1999, and then increased to 92% in 2000.

Figure 10-8. Melanoma of skin with AJCC staging by year and sex

Percent of melanoma of skin cases staged with AJCC staging methodology by year and sex, RI, 1989-2000.



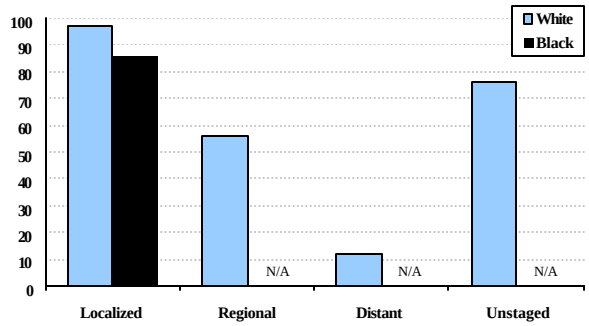
Source: RICR, HEALTH

The proportion of diagnosed melanoma of skin cases staged using the AJCC system among males increased from 48% in 1990 to 68% in 1996, dropped to 28% in 1998 and increased slightly to 42% in 2000. Among females, this proportion increased from 49% in 1990 to 58% in 1993, decreased to 29% in 1998 and increased slightly to 35% in 2000.

Survival

Figure 10-9. Male melanoma of skin survival rates by race and stage

Five year relative invasive melanoma of skin survival rates by race and stage of disease at diagnosis among males, US, 1992-1999.*



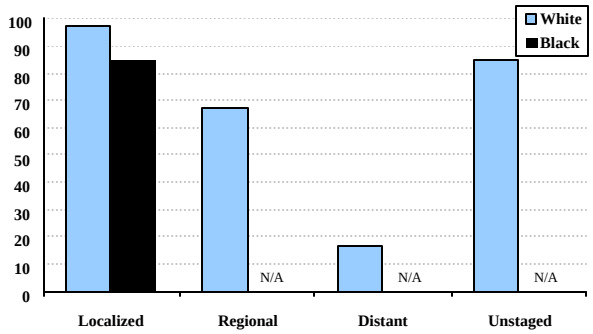
* Survival rates are relative rates expressed as percents.
** The standard error of the survival rate is greater than 10 percentage points.
N/A Statistic could not be calculated.
Source: *SEER Cancer Statistics Review, 1975 -2000.*

Based on US data from 1992-1999, five-year relative survival rates for male melanoma of skin are higher when diagnosed at earlier stages of disease, and for localized cases are higher among white males than black males. Melanomas of skin that are diagnosed while localized have a survival rate of 97% among white males and 86% among black males. Cancers that are not diagnosed until a distant stage have a survival rate of 17% among white males. Data for black male survival rates are not available for regional, distant, and unstaged melanoma of skin cases.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 10-10. Female melanoma of skin survival rates by race and stage

Five year relative invasive melanoma of skin survival rates by race and stage of disease at diagnosis among females, US, 1992-1999.*



* Survival rates are relative rates expressed as percents.
** The standard error of the survival rate is between 5 and 10 percentage points.
Source: *SEER Cancer Statistics Review, 1975 -2000.*

Based on US data from 1992-1999, five-year relative survival rates for female melanoma of skin are higher when diagnosed at earlier stages of disease, and for localized are higher among white females than black females. Melanomas of skin that are diagnosed while localized have a survival rate of 97% among white females and 85% among black females. Cancers that are not diagnosed until a distant stage have a survival rate of 16% among white females. Data for black female survival rates are not available for regional, distant, and unstaged melanoma of skin cases.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Discussion

Summary of Burden

Although the annual number of new melanomas diagnosed in Rhode Island is relatively small, their burden is significant because they are preventable, they are increasing, and because melanomas diagnosed at later stages are difficult to control.

The incidence of melanoma of skin increased approximately 50% over the period 1987-2001. The annual averages of 197 newly diagnosed melanoma of skin cases and 31 deaths are theoretically preventable by limiting sun exposure, by wearing protective clothing and using sunscreen, and by performing regular skin exams (fair-skinned adults should get regular skin examinations from a dermatologist).

Relative Burden

In the 1990's, incidence of melanoma of skin was lower in Rhode Island than in the nation as a whole, despite upward trends in both areas.

However, mortality rates were similar.

Disparities

The burden of melanoma of skin was greater among men than women in the 1990's.

Melanoma incidence and mortality are higher among males than females.

White persons are more likely to be diagnosed with melanoma of skin than black persons, largely because those with fair skin are at a higher risk than those with dark skin.

Incidence of melanoma of skin is substantially higher among whites than blacks, largely because fair-skinned persons are at a significantly greater risk of developing melanoma of skin than dark-skinned persons. However, mortality from melanoma of skin is only slightly higher among whites than blacks, a differential worthy of further investigation.

Status of Control Strategies

The burden of melanoma of skin may be reduced by increasing the proportion of people who practice sun safety behaviors, and by assuring state-of-the-art treatment for all skin cancer patients. Melanoma of skin may be prevented by limiting sun exposure, by preventing sunburn, and among persons at high risk (persons with fair skin, significant history of excessive sun exposure, or family history of melanoma), by visiting annually with a dermatologist. Another important control strategy is to assure state-of-the-art treatment for all cancer patients through improvement of basic treatment infrastructure.

By the year 2000, 9 out of 10 melanoma of skin case reports in Rhode Island were from American College of Surgeons (ACOS) approved hospitals.

In the 1990's, the proportion of melanoma of skin tumors staged with American Joint Committee on Cancer (AJCC) methodology decreased, a cause for concern.

Cancer Control Priorities for 2004

Reduce the burden of melanoma of skin by increasing the proportion of persons who practice sun safety behaviors and who follow recommended guidelines.

Increase the proportion of Rhode Islanders who practice sun safety behaviors and follow recommended guidelines by (a) promoting limited sun exposure and use of sunscreen, (b) promoting awareness of major risk factors, and (c) among high risk populations, promoting regular visits with a dermatologist.

Reduce the burden of melanoma of skin by increasing the proportion of skin cancer patients who receive state-of-the-art treatment.

Increase surveillance of sun safety behaviors.

Increase surveillance of sun safety behaviors, such as limiting sun exposure and using sunscreen. Conduct a careful analysis of risk behaviors in Rhode Island.

Begin to eliminate disparities by identifying reasons for disparities in relative mortality.

Identify reasons for racial disparities in relative mortality, using data from the Rhode Island Cancer Registry, the Behavioral Risk Factor Surveillance System, the Rhode Island Health Interview Survey, and death certificate data.

OROPHARYNGEAL CANCER

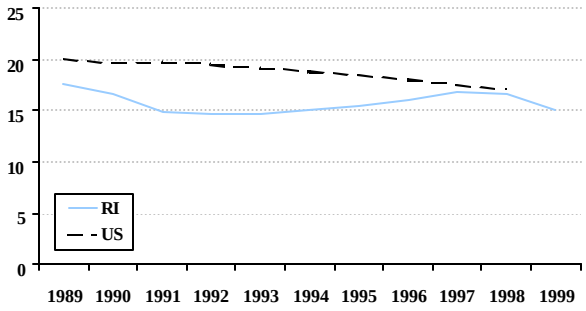
Oropharyngeal cancer is a type of head and neck cancer; it originates in the oropharynx, which is the middle part of the pharynx. The soft palate (or back part of the mouth), the base of the tongue, and the tonsils make up the region referred to as the oropharynx. (NCI summaries)

Oropharyngeal cancers are not among the most prevalent cancers in the state (and the nation), but they are significant for cancer control efforts, because most tumors of the oral cavity and pharynx are considered preventable. Oropharyngeal cancers accounted for 2% of all newly diagnosed cancers in 1997-2001, with an annual average of 73 male and 41 female newly diagnosed cases in each of the five years 1997-2001. Oropharyngeal cancers accounted for about 1% of all cancer deaths in 1996-2000, with an annual average of 16 male and 13 female deaths in each of the five years 1996-2000. In Rhode Island, approximately 730 people alive today were diagnosed with oropharyngeal cancer at some point in the past 25 years (446 males and 283 females in 2000). (RICR)

Cancer Rates

Figure 11-1. Male oropharyngeal cancer incidence by year

Average annual invasive oral cavity cancer incidence rates** by year among males, RI and US, 1987-2001***.*



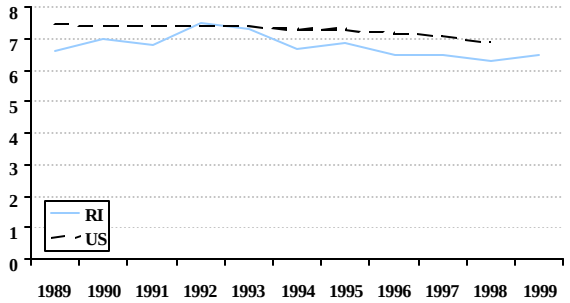
* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are five-year moving averages.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

The age-adjusted incidence of invasive oropharyngeal cancer among RI males of all races declined from 17.6 per 100,000 in 1989 to 14.7 per 100,000 in 1992, increased to 16.7 per 100,000 in 1998, then decreased to 15.1 in 1999 (based on five-year moving averages). In contrast, the age-adjusted incidence of invasive oropharyngeal cancer among US males of all races decreased from 20.1 per 100,000 in 1989 to 17.2 per 100,000 in 1998 (based on five-year moving averages).

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 11-2. Female oropharyngeal cancer incidence by year

Average annual invasive oral cavity cancer incidence rates** by year among females, RI and US, 1987-2001***.*



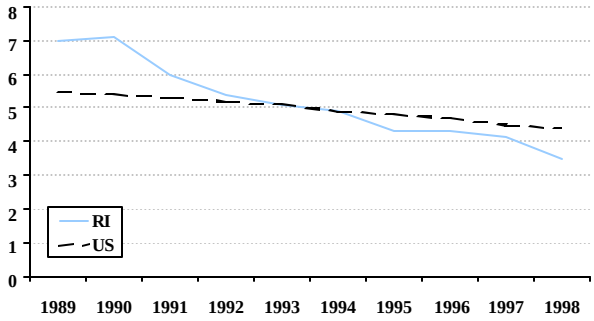
* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are five-year moving averages.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

The age-adjusted incidence of invasive oropharyngeal cancer among RI females of all races varied from 7.5 per 100,000 in 1992 to 6.5 per 100,000 in 1999 (based on five-year moving averages). This may suggest a decline in oropharyngeal cancer incidence among RI females. The age-adjusted incidence of invasive oropharyngeal cancer among US females of all races declined from 7.5 cases per 100,000 in 1989 to 6.9 cases per 100,000 in 1998 (based on five-year moving averages).

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 11-3. Male oropharyngeal cancer mortality by year

Average annual oral cavity cancer mortality rates by year among males, RI and US, 1989-1998**.*



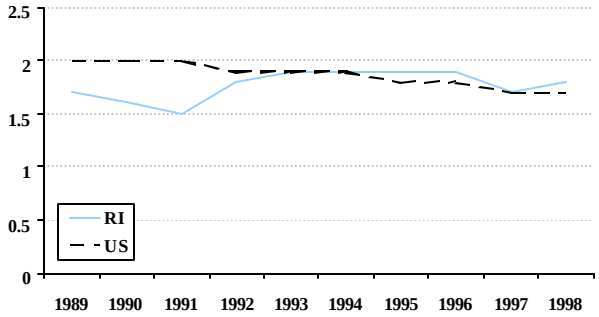
* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are five-year moving averages.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

The age-adjusted mortality of invasive oropharyngeal cancer among RI males of all races declined strongly from 7.0 deaths per 100,000 in 1989 to 3.5 deaths per 100,000 in 1998, paralleled by a weaker decline among US males of all races (from 5.5 in 1989 to 4.4 in 1998; based on five-year moving averages). The disparity between the mortality rates for RI males and US males changed over the period of observation, with RI beginning the decade with higher-than-US mortality and ending the decade with lower-than-US mortality.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 11-4. Female oropharyngeal cancer mortality by year

Average annual oral cavity cancer mortality rates by year among females, RI and US, 1987-2000**.*



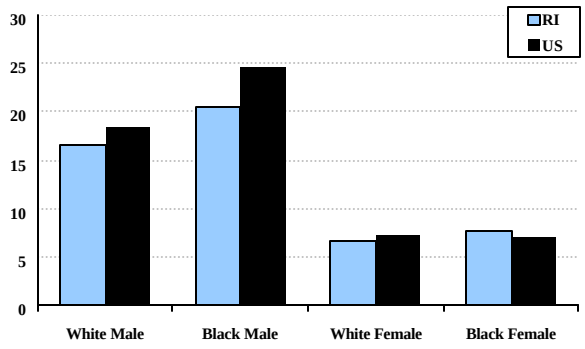
* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are five-year moving averages.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

The age-adjusted mortality of invasive oropharyngeal cancer among RI females of all races showed little variation over the 1989-1998 period, averaging about 1.8 deaths per 100,000. The age-adjusted mortality of invasive oropharyngeal cancer among US females of all races declined from 2.0 in 1989 to 1.7 in 1998 (based on five-year moving averages). The disparity between the mortality rates for RI females and US females decreased over the period of observation, with US females as a whole experiencing the benefit.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 11-5. Oropharyngeal cancer incidence by race and sex

Average annual invasive oropharyngeal cancer incidence rates by race and sex, RI and US, 1987-2000.*



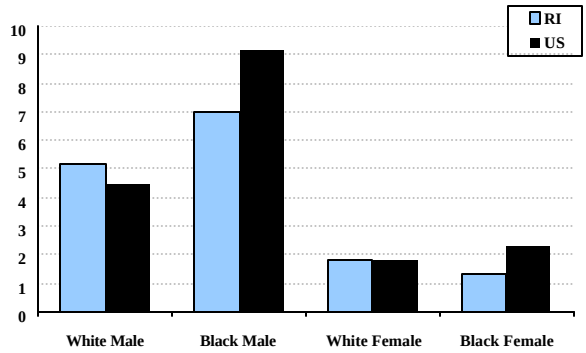
* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

In 1987-2000, oropharyngeal cancer incidence rates in RI were higher among black males (21 cases per 100,000) than white males (17 cases per 100,000). US male rates were also higher among black males. Female oropharyngeal cancer incidence rates during this period were similar among whites and blacks in RI (7 cases per 100,000), and in the US.

[Note: RI incidence data for 2001 is currently available. US incidence data is only available through 2000. For comparability, the figure at left contains RI data through 2000.]

Figure 11-6. Oropharyngeal cancer mortality by race and sex

Average annual oropharyngeal cancer mortality rates by race and sex, RI and US, 1987-2000.*



* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

In 1987-2000, oropharyngeal cancer mortality rates in RI were slightly higher among black males (7 deaths per 100,000) than white males (6 per 100,000). In the US, male rates were higher among black males. Female oropharyngeal cancer mortality rates during this period were 2 deaths per 100,000 among white females and 1 death per 100,000 among black females in RI. The US female rate was similar for both white and black females.

***Healthy People 2010* Targets**
Mortality: By 2010, reduce the oropharyngeal cancer death rate to 2.7 deaths per 100,000 population (age-adjusted to the year 2000 standard population of the United States; baseline = 3.0 deaths per 100,000 population in 1998).

Risk Factors

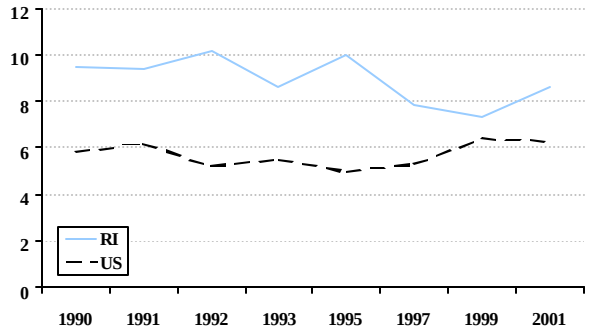
Major risk factors for oropharyngeal cancer are tobacco use in all forms and alcohol abuse, accounting for approximately 90% of oral cancer in the US. (Clinical) Increased risk has also been associated with occupational exposures, solar radiation, presence of premalignant lesions, and infection with human immunodeficiency virus (HIV). (Clinical)

Prevention

Oropharyngeal cancer is strongly related to chronic tobacco use and chronic "high-risk" drinking (14 or more alcoholic drinks per week for males and seven or more alcoholic drinks per week for women), and is therefore theoretically preventable by abstaining from tobacco and limiting alcohol consumption. (NIH) Clinicians should advise patients to discontinue use of all forms of tobacco and to limit consumption of alcohol. (Clinical)

Figure 11-7. Male chronic drinking by year

*Percent of male respondents 18 and older who report an average of two or more alcoholic drinks per day (14 or more drinks per week) by year, RI and US, 1990-2001**



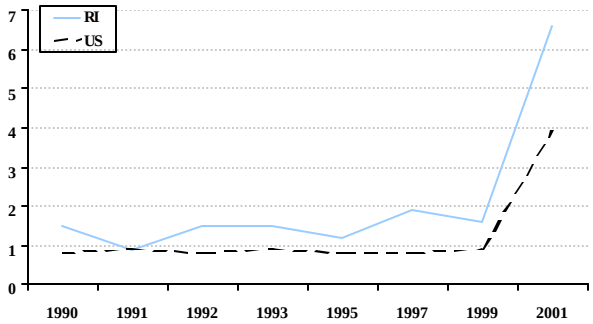
* Data not available for the following years: 1994, 1996, 1998, 2000.
Source: RI -BRFSS, HEALTH; BRFSS, CDC

From 1990 through 2001, the proportion of RI males who had reported an average of two or more alcoholic drinks per day varied between 7% and 10%, showing no definite trend, but substantially exceeding the US state median throughout the period.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 11-8. Female chronic drinking by year

*Percent of female respondents 18 and older who report an average of two or more alcoholic drinks per day (7 or more drinks per week in 2001 – previously 14 or more drinks per week) by year, RI and US , 1990-2001**



* Data not available for the following years: 1994, 1996, 1998, 2000.
Source: RI -BRFSS, HEALTH; BRFSS, CDC

From 1990 through 1999, the proportion of RI females who had reported an average of two or more alcoholic drinks per day varied between 1% and 2%, showing no definite trend, but substantially exceeding the US state median throughout the period in all years but one. In 2001, the first year in which the Behavioral Risk Factor Surveillance System used the revised standard for chronic drinking among females (an average of one or more alcoholic drinks per day), the proportion of RI females who met or exceeded the standard (6.6 %) was almost double the US state median (3.9 %).

[Note: Separate graphs for males and females may not have the same y-axis scale.]

***Healthy People 2010* Targets**
Alcohol Use: By 2010, reduce the proportion of adults aged 21 years and over who exceed guidelines for low-risk drinking to 50 % of people who regularly use alcohol (baseline = 73 % in 1992). [Low risk drinking: Males – less than 14 drinks per week; females – less than 7 drinks per week.]

Please see **Lung Cancer** (section 9) for information on proportion of the population that are current smokers and for *Healthy People 2010* targets for tobacco use.

Screening

The effectiveness of screening for early oropharyngeal tumors is equivocal, (Clinical) although survival is clearly related to stage of disease at diagnosis. (Ries) The US Preventive Services Task Force last issued a recommendation on screening for oral cancer in 1996, at which time it stated: "There is insufficient evidence to recommend for or against routine screening of asymptomatic persons for oral cancer by primary care clinicians. Clinicians should remain alert

to signs and symptoms of oral cancer and premalignancy in persons who use tobacco or regularly use alcohol." (Clinical)

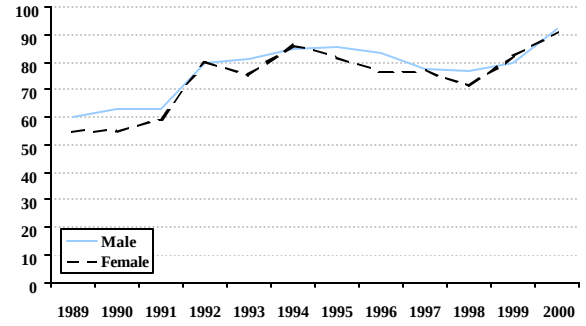
Treatment

Surgery is a treatment option for many oropharyngeal cancer patients. Surgery may be followed by radiation. Non-surgical options for such patients include chemotherapy (usually administered by injection of anticancer drug), radiation therapy, and clinical trials. (NCI summaries)

The percent of oropharyngeal cancer cases in RI ACOS-approved treatment programs and the percent staged with AJCC staging methodology is detailed below.

Figure 11-9. Oropharyngeal cancer in ACOS programs by year and sex

Percent of oropharyngeal cancer cases that were or are treated in ACOS approved cancer treatment programs by year and sex, RI, 1989-2000.

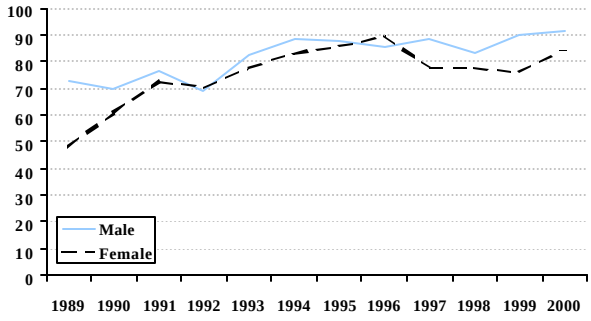


Source: RICR, HEALTH

The percent of cancer case reports in RI that were or are from ACOS approved hospital cancer treatment programs increased from 73% in 1989 to 92% in 2000 among males from 48% in 1989 to 85% in 2000 among females.

Figure 11-10. Oropharyngeal cancer with AJCC staging by year and sex

Percent of oropharyngeal cancer cases staged with AJCC staging methodology by year and sex, RI, 1989-2000.



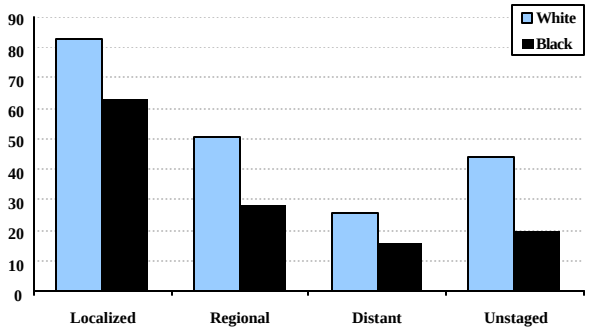
Source: RICR, HEALTH

The proportion of diagnosed oropharyngeal cancer cases staged using the AJCC system among males averaged 72% in 1989-1992, and then increased to 92% in 2000. Among females, this proportion increased from 48% in 1989 to 90% in 1996, then averaged 79% in 1997-2000.

Survival

Figure 11-11. Male oropharyngeal cancer survival rates by race and stage

Five year relative invasive oropharyngeal cancer survival rates by race and stage of disease at diagnosis among males, US, 1992-1999.*



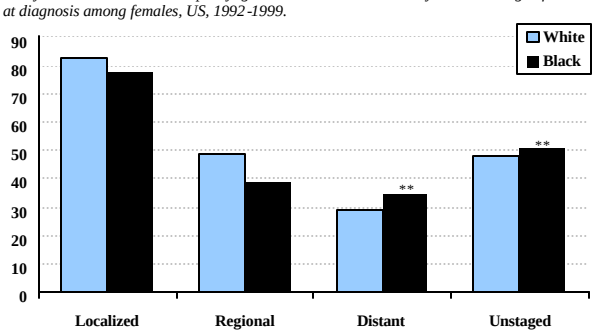
* Survival rates are relative rates expressed as percents.
Source: *SEER Cancer Statistics Review, 1975 -2000.*

Based on US data from 1992-1999, five-year relative survival rates for male oropharyngeal cancer are higher when diagnosed at earlier stages of disease, and are higher among white males than black males. Oropharyngeal cancers diagnosed while localized have a five-year survival rate of 83% among white males and 63% among black males. Cancers that are not diagnosed until a distant stage have a five-year survival rate of 26% among whites and 16% among blacks.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 11-12. Female oropharyngeal cancer survival rates by race and stage

Five year relative invasive oropharyngeal cancer survival rates by race and stage of disease at diagnosis among females, US, 1992 -1999.*



* Survival rates are relative rates expressed as percents.
** The standard error of the survival rate is between 5 and 10 percentage points.
Source: *SEER Cancer Statistics Review, 1975 -2000.*

Based on US data from 1992-1999, five-year relative survival rates for female oropharyngeal cancer are higher when diagnosed at earlier stages of disease. Oropharyngeal cancers diagnosed while localized have a survival rate of 83% among white females and 78% among black females. Cancers that are not diagnosed until a distant stage have a survival rate of 29% among whites and 35% among blacks. Five-year survival rates are higher among whites than blacks for oropharyngeal cancers diagnosed while localized or regional, and higher among blacks for those diagnosed while distant or unstaged.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Discussion

Summary of Burden

Although the number of new oropharyngeal tumors diagnosed in Rhode Island is relatively small, their burden is significant because they are preventable, because rates of risk behaviors in Rhode Island are higher than national averages, and because oropharyngeal tumors diagnosed at later stages have lower survival rates.

The annual averages of 114 newly diagnosed oropharyngeal cancer cases and 29 deaths are theoretically preventable by avoiding tobacco use and limiting alcohol consumption. Regular oral cancer examinations can detect oral cancers at an earlier, more treatable stage.

Among Rhode Island men, mortality from oropharyngeal cancer was halved in the 1990's.

Mortality decreased from 7.0 to 3.5 deaths per 100,000 men over the period 1987-2000. Rhode Island has already reached the 2010 goal for a mortality decline from oropharyngeal cancer (when recent mortality rates for men and women are averaged), but given the state's average (for US) rates of tobacco use, and its above-average rates of chronic drinking, whether we will be able to sustain this decline remains a question.

Relative Burden

Among Rhode Island men, oropharyngeal cancer mortality was higher than the national rate in the early 1990's and was lower than the national rate in the late 1990's.

Disparities

In Rhode Island, the burden of oropharyngeal cancer is higher among men than women.

Incidence and mortality from oropharyngeal cancer were higher among men than women in the 1990's. However, the substantial decrease in mortality that occurred among RI men narrowed the gender gap in the late 1990's.

In Rhode Island, the burden of oropharyngeal cancer is higher among black men than white men.

In Rhode Island, both incidence and mortality were higher among black men than white men in the 1990's. At the national level, the racial disparity in mortality was more pronounced.

Status of Control Strategies

The burden of oropharyngeal cancer may be lessened by decreasing the proportion of persons who smoke, by decreasing the proportion of people who consume alcohol excessively, by promoting regular oral cancer examinations, and by assuring state-of-the-art treatment for all oropharyngeal cancer patients. Oral exams are highly recommended for persons who regularly use tobacco or alcohol.

In the 1990's, the proportion of chronic drinkers was higher in Rhode Island than in the nation as a whole.

Given Rhode Island's high rates of chronic drinking, especially among men, it is questionable whether the decline in male oropharyngeal cancer mortality will be sustained.

By the year 2000, 9 out of 10 oropharyngeal cancer case reports in Rhode Island were from American College of Surgeons (ACOS) approved hospitals.

By the year 2000, 9 out of 10 oropharyngeal tumors in Rhode Island were staged with American Joint Committee on Cancer (AJCC) methodology.

Cancer Control Priorities for 2004

Reduce the burden of oropharyngeal cancer by increasing the proportion of people who do not use tobacco, who avoid excessive alcohol consumption, and who follow recommended guidelines for screening.

Increase the proportion of Rhode Islanders who do not use tobacco and who avoid excessive alcohol consumption by (a) preventing tobacco use among youth, (b) promoting tobacco cessation, (b) promoting limited alcohol consumption, and (c) among high-risk populations, promoting regular oral exams.

Reduce the burden of oropharyngeal cancer by increasing the proportion of oropharyngeal cancer patients who receive state-of-the-art treatment.

Increase surveillance of tobacco and alcohol consumption behaviors.

Increase surveillance of tobacco and alcohol consumption behaviors, such as use of spit tobacco. Conduct a careful analysis of risk behaviors in Rhode Island.

Begin to eliminate disparities by identifying reasons for disparities in relative mortality.

Identify reasons for gender and race disparities in mortality from oropharyngeal cancer, using data from the Rhode Island Cancer Registry, the Behavioral Risk Factor Surveillance System, the Rhode Island Health Interview Survey, and death certificate data.

OVARIAN CANCER

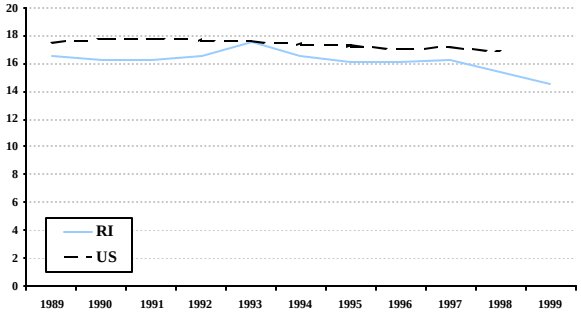
Ovarian cancer originates in the inner tissues or outer lining of the ovaries, or female reproductive organs. Ovarian cancer can be divided into three categories: epithelial carcinoma, germ cell cancer, and stromal cancer. Epithelial carcinomas are tumors that originate in the epithelial cells that form the lining of the ovaries; it is the most common type of ovarian cancer. Germ cell cancer originates in the cells that are to become the egg cells that are released each month from the ovary. It is not common (only about 5% of ovarian cancer cases) and is usually found in younger women. Stromal cell cancer originates in the cells that make up the tissues that hold the ovary together; it also accounts for only about 5% of ovarian cancer cases. (RICAN)

Ovarian cancer is the sixth most commonly diagnosed cancer among RI females (annual average of 88 newly diagnosed cases in each of the five years 1997-2001), and accounted for less than 2% of newly diagnosed cancers in 1997-2001, including both males and females. Ovarian cancer is the fifth leading cause of cancer death among RI females (annual average of 57 deaths in each of the five years 1996-2000), and accounted for just over 2% of all cancer deaths in 1996-2000, including both males and females. In Rhode Island, approximately 689 females alive today were diagnosed with ovarian cancer at some point in the past 25 years (2000). (RICR)

Cancer Rates

Figure 12-1. Ovarian cancer incidence by year

Average annual invasive ovarian cancer incidence rates** by year among females, RI and US, 1987-2001***.*

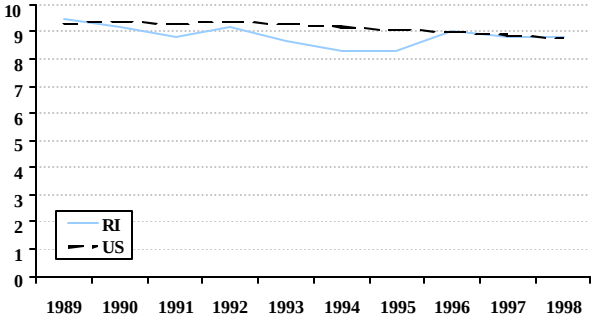


* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are five-year moving averages.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

The age-adjusted incidence of invasive ovarian cancer among RI females of all races was around 16.5 cases per 100,000 females from 1989 to 1993, then decreased to 14.5 cases per 100,000 in 1999 (based on five-year moving averages). The age-adjusted incidence of invasive ovarian cancer among US females of all races may show signs of a small decline (from 17.8 cases per 100,000 females in 1990 to 16.9 cases per 100,000 in 1998; based on five-year moving averages).

Figure 12-2. Ovarian cancer mortality by year

Average annual ovarian cancer mortality rates by year among females, RI and US, 1987-2000***.

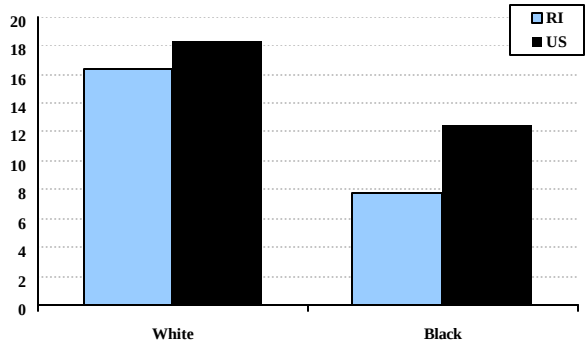


* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are five-year moving averages.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

The age-adjusted mortality of invasive ovarian cancer among RI females of all races hovered around 9 deaths per 100,000 females for the entire period of observation (based on five-year moving averages). The age-adjusted mortality of invasive ovarian cancer among US females of all races may have experienced a small but steady decline from 9.4 deaths per 100,000 females in 1992 to 8.8 deaths per 100,000 females in 1998 (based on five-year moving averages).

Figure 12-3. Ovarian cancer incidence by race

Average annual invasive ovarian cancer incidence rates by race among females, RI and US, 1987-2000.*



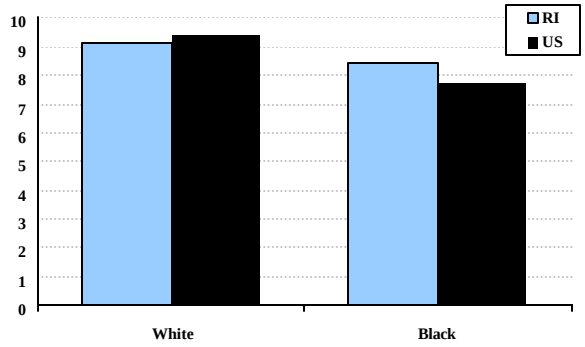
* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

In 1987-2000, ovarian cancer incidence rates in RI were higher among white females (16 cases per 100,000) than black females (8 cases per 100,000). US female rates were also higher among white females (18 cases per 100,000) than black females (12 cases per 100,000).

[Note: RI incidence data for 2001 is currently available. US incidence data is only available through 2000. For comparability, the figure at left contains RI data through 2000.]

Figure 12-4. Ovarian cancer mortality by race

Average annual ovarian cancer mortality rates by race among females, RI and US, 1987-2000.*



* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

In 1987-2000, ovarian cancer mortality rates in RI were slightly higher among white females (9 deaths per 100,000) than black females (8 deaths per 100,000). US female rates were also slightly higher among white females.

Risk Factors

Important risk factors for ovarian cancer include older age (females over age 60), low parity, and family history of ovarian cancer. (Clinical) Factors that may be associated with decreased risk include use of oral contraceptives, childbearing and breast-feeding, tubal ligation, and hysterectomy. (NCI summaries)

Prevention

There are currently no known preventives for ovarian cancer. However, control strategies include risk education and effective evaluation of risk among all women.

Screening

Screening tests for ovarian cancer include pelvic examination, Pap test, ultrasound, and measurement of serum tumor markers. (Clinical) Currently, screening tests have not been found effective in the reduction of morbidity or mortality from ovarian cancer, and most organizations do not recommend routine screening of asymptomatic women. (Clinical) The American College of Physicians does recommend counseling high-risk women about the potential benefits and harms of ovarian cancer screening. (Clinical)

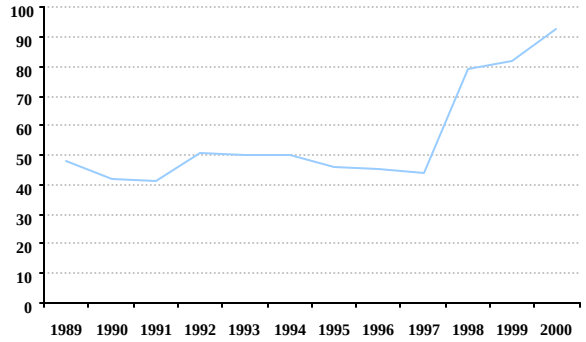
Treatment

The goal of treatment for ovarian cancer is to remove, destroy, or control the tumor and its ability to spread. Several factors, such as the patient's stage of life, general health, size and location of tumors, and personal feelings, are taken into consideration when deciding what treatment option is right for a patient. Surgical treatment for ovarian cancer is typically performed after diagnosis as treatment, however, in cases of very high risk, surgery may occur before diagnosis as a preventative measure. The following surgical procedures may be used in very high-risk situations: tubal ligation, oophorectomy, and hysterectomy. The following surgical procedures may be used as treatment after diagnosis: oophorectomy, hysterectomy, and debulking. Non-surgical treatment options include chemotherapy (pill form, intravenous injections, or intraperitoneally), radiation therapy, biological therapy, and clinical trials. (RICAN)

The percent of ovarian cancer cases in RI ACOS-approved treatment programs and the percent staged with AJCC staging methodology is detailed below.

Figure 12-5. Ovarian cancer in ACOS programs by year

Percent of ovarian cancer cases that were or are treated in ACOS approved cancer treatment programs by year among females, RI, 1989-2000.

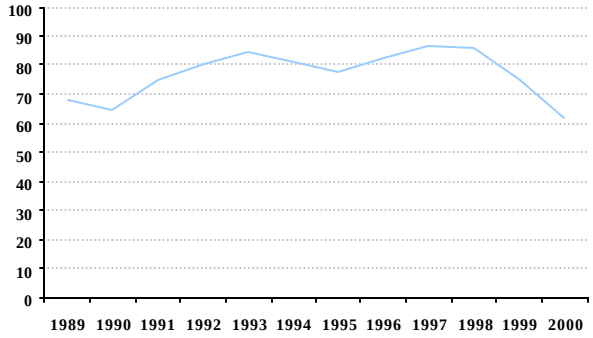


Source: RICR, HEALTH

The percent of ovarian cancer case reports from ACOS approved hospital cancer treatment programs in RI varied between 40-50% from 1989 to 1997, increased dramatically to 79% in 1998 and then to 93% in 2000.

Figure 12-6. Ovarian cancer with AJCC staging by year

Percent of ovarian cancer cases staged with AJCC staging methodology by year among females, RI, 1989-2000.

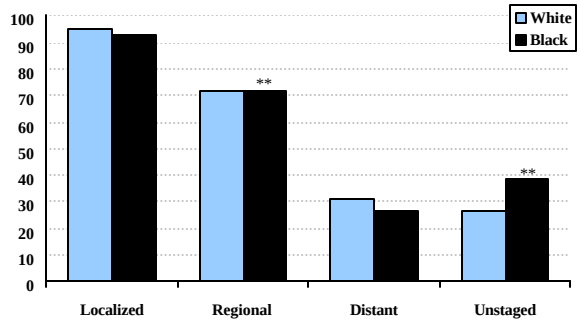


Source: RICR, HEALTH

The proportion of diagnosed ovarian cancer cases staged using the AJCC system increased from 68% in 1990 to 92% in 1998, then decreased to 67% in 2000.

Survival

Figure 12-7. Ovarian cancer survival rates by race and stage
Five year relative invasive ovarian cancer survival rates by race and stage of disease at diagnosis among females, US, 1992-1999.*



* Survival rates are relative rates expressed as percents.
** The standard error of the survival rate is between 5 and 10 percentage points.
Source: *SEER Cancer Statistics Review, 1975-2000.*

Based on US data from 1992-1999, five-year relative survival rates for ovarian cancer are higher when diagnosed at earlier stages of disease. Ovarian cancers diagnosed while localized have a five-year survival rate of 95% among white females and 93% among black females. Cancers that are not diagnosed until a distant stage have a five-year survival rate of 31% among whites and 26% among blacks. Five-year survival rates are slightly higher among whites than blacks for ovarian cancers diagnosed while localized or distant, and are similar among whites and blacks for those diagnosed while regional.

Discussion

Summary of Burden

Although the annual number of new ovarian tumors diagnosed in Rhode Island is relatively small, the burden is significant because the case-fatality of ovarian cancer, except when diagnosed at the earliest stage of disease, is high.

For example, the five-year survival rate for women diagnosed with localized ovarian cancer is about 94%, while the survival rate among women diagnosed with distant ovarian cancer is about 28%.

The incidence of ovarian cancer in Rhode Island may have started to decline in the late 1990's.

The reason for this decline is unknown.

Relative Burden

The burden of ovarian cancer is slightly less in Rhode Island than in the nation as a whole.

Both incidence and mortality were slightly lower in Rhode Island than in the United States as a whole in the 1990's, although both followed a similar trend.

Disparities

In Rhode Island, white women are about twice as likely as black women to be diagnosed with ovarian cancer.

A similar (but slightly smaller) differential is seen at the national level.

Status of Control Strategies

The burden of ovarian cancer may be reduced by increasing women's awareness of risk factors for ovarian cancer, by increasing the proportion of women who have evaluated their risk, by assuring state-of-the-art gynecological care for high-risk women, and by assuring state-of-the-art treatment for all ovarian cancer patients.

At the present time, the proportion of adult women in Rhode Island who have evaluated their risk is unknown because this issue has not been a focus of statewide surveys from which we normally derive such data.

By the year 2000, 9 out of 10 ovarian cancer case reports in Rhode Island were from American College of Surgeons (ACOS) approved hospitals.

In Rhode Island, the proportion of ovarian tumors staged with American Joint Committee on Cancer (AJCC) methodology increased from 73% in 1989 to 92% in 1998, then decreased to 67% in 2000. The decrease is under investigation, as it is a potential cause for concern. Rhode Island Cancer Registry staff have ascertained that the decrease is not a computational error, have identified the sources of case reports with "unknown" AJCC stage, and are in communication about this problem with the relevant institutional cancer registries.

Cancer Control Priorities for 2004

Reduce the burden of ovarian cancer by promoting awareness of risk factors and by promoting evaluation of risk.

Use promotion techniques to increase the proportion of Rhode Islanders who are aware of important risk factors for ovarian cancer, such as older age and family history of ovarian cancer, and who have evaluated their level of risk.

Reduce the burden of ovarian cancer by increasing the proportion of ovarian cancer patients who receive state-of-the-art treatment.

Monitor the literature on the effectiveness of ovarian cancer screening tests.

Current research does not support the use of screening tests for ovarian cancer, but new approaches to ovarian cancer screening are under development and should be monitored for effectiveness.

Begin to eliminate disparities by identifying reasons for disparities in relative mortality.

Identify reasons for race disparities in ovarian cancer incidence, using data from the Rhode Island Cancer Registry, the Behavioral Risk Factor Surveillance System, and the Rhode Island Health Interview Survey.

PROSTATE CANCER

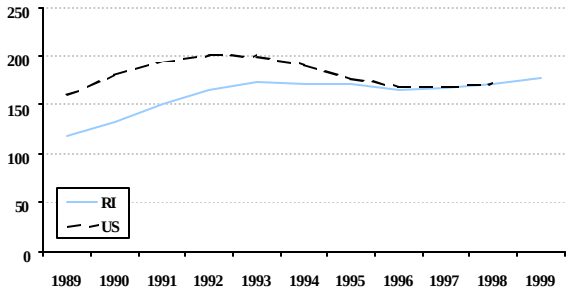
Prostate cancer begins as a tumor in the prostate gland of the urinary tract. It may spread to other areas of the body. Enlargement of the prostate is often normal for men, especially as they age. However, abnormal enlargement can be the result of a malignant tumor. (RICAN)

Prostate cancer is the most commonly diagnosed cancer among RI males (average annual of 850 newly diagnosed cases in each of the five years 1997-2001), and accounted for 14% of all newly diagnosed cancers in 1997-2001, including both males and females. Prostate cancer is the second leading cause of cancer death among RI males (average annual of 140 deaths in each of the five years 1996-2000), and accounted for 6% of all cancer deaths in 1996-2000, including both males and females. In Rhode Island, about 5,918 males alive today were diagnosed with prostate cancer at some point in the past 25 years (2000). (RICR)

Cancer Rates

Figure 13-1. Prostate cancer incidence by year

Average annual invasive prostate cancer incidence rates** by year among males, RI and US, 1987-2001***.*

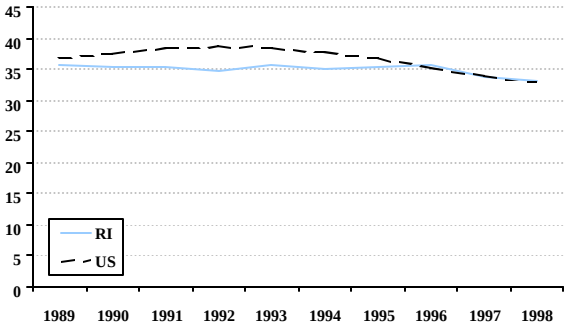


* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are five-year moving averages.
Source: RICR, HEALTH – calculated with *SEER*Stat*; *SEER Cancer Statistics Review, 1973-1999;* 1998 US data is from SEER Public-Use 1973-2000 Data – calculated with *SEER*Stat*.

The age-adjusted incidence of invasive prostate cancer among RI males of all races increased from 118 cases per 100,000 in 1989 to 173 cases per 100,000 in 1993 and remained around 170 cases per 100,000 males until 1998 (based on five-year moving averages). From 1989 to 1992, the age-adjusted incidence of invasive prostate cancer among US males of all races increased from 160 cases per 100,000 males to 201 cases per 100,000 men. This was followed by a decrease to 169 cases per 100,000 in 1997 (based on five-year moving averages). RI's invasive prostate cancer rates were below rates for the nation as a whole until 1997.

Figure 13-2. Prostate cancer mortality by year

Average annual prostate cancer mortality rates by year among males, RI and US, 1987-2000**.*

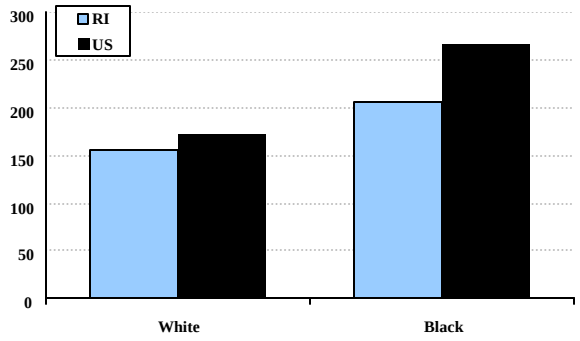


* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are five-year moving averages.
Source: CDC WONDER, CDC; 1998 US data is from SEER US Mortality 1969-2000 Data – calculated with *SEER*Stat*.

No significant change has occurred in average annual age-adjusted mortality of invasive prostate cancer among RI males of all races (about 35 deaths per 100,000 from 1989 to 1998, based on five-year moving averages). The analogous prostate cancer mortality rates for US males of all races averaged 38 deaths per 100,000 from 1989 through 1995, then decreased to a low of 34 deaths per 100,000 in 1997 (based on five-year moving averages).

Figure 13-3. Prostate cancer incidence by race

Average annual invasive prostate cancer incidence rates by race among males, RI and US, 1987-2000.*



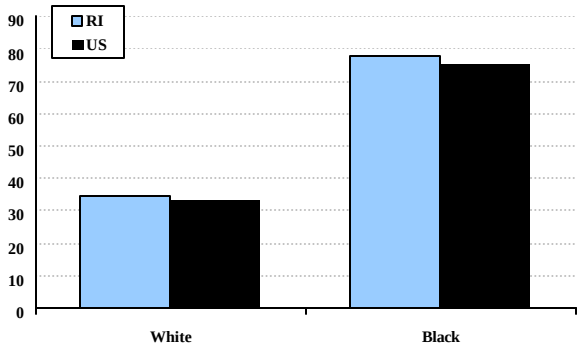
* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

In RI, during 1987-2000, prostate cancer incidence rates were higher among black males (206 cases per 100,000) than among white males (156 cases per 100,000). This gap was larger among US black males (268 cases per 100,000) and US white males (172 cases per 100,000).

[Note: RI incidence data for 2001 is currently available. US incidence data is only available through 2000. For comparability, the figure at left contains RI data through 2000.]

Figure 13-4. Prostate cancer mortality by race

Average annual prostate cancer mortality rates by race among males, RI and US, 1987-2000.*

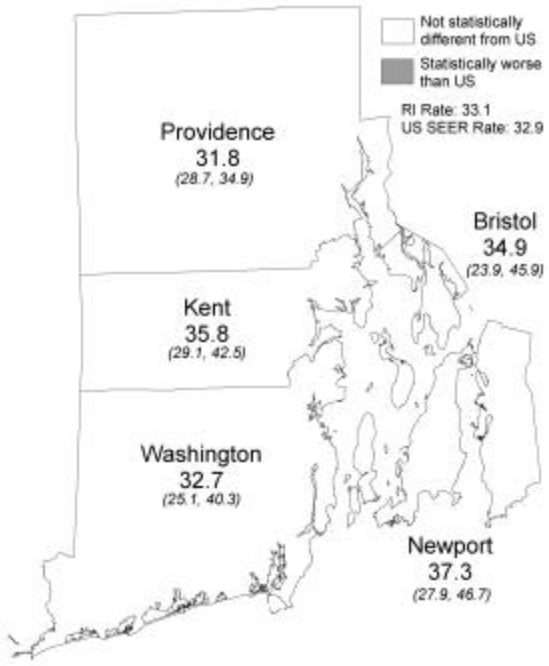


* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

In RI, during 1987-2000, prostate cancer mortality rates were more than two times as high among black males (78 deaths per 100,000) than among white males (34 deaths per 100,000). A similar difference was seen in US prostate cancer mortality rates.

Figure 13-3. Prostate cancer mortality by county

Average annual prostate cancer mortality rates among males by county and statistical difference from US rates, RI, 1996-2000*



In 1996-2000, average annual prostate cancer mortality rates among males in RI counties were not statistically different from the US rate.

[Note: Maps are color-coded based on comparison to US mortality rates. When the US rates fall within the 95% confidence interval (shown in parentheses), it suggests that there is no statistical difference. Please see Key for Maps in **About the Data** (section 3) for a clear delineation of counties.]

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000.
Data source: Office of Vital Records, HEALTH; calculated with *SEER*Stat* .
Map source: HEALTH gis.

Healthy People 2010 **Targets**
Mortality: By 2010, reduce the prostate cancer death rate to 28.8 deaths per 100,000 males (age-adjusted to the year 2000 standard population of the United States; baseline = 32.0 deaths per 100,000 males in 1998).

Risk Factors

The risk of developing prostate cancer is higher among men over age 50 (risk increases with age), African Americans, and those with a family history of prostate cancer. (Clinical, NCI summaries) Speculations about the role of diet, environmental factors, and hormones as risk factors for prostate cancer are inconclusive. (Stanford)

Prevention

Although prostate cancer has been linked to several risk factors, effective preventives are unknown. (Stanford)

Screening

Common screening tests for prostate cancer are the prostate-specific antigen (PSA) and the digital rectal examination (DRE). Although the PSA screening test is non-invasive, relatively inexpensive, and effective in the early detection of prostate tumors, its use is controversial. Clinical trials in progress have not yet proven that early detection and treatment are effective in

reducing prostate cancer mortality, mass screening efforts are costly, and treatment is associated with high morbidity (e.g. urinary incontinence and sexual dysfunction).

Information on prostate cancer screening rates is unavailable at this time.

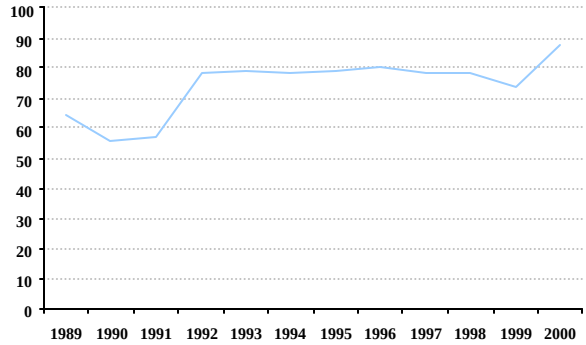
Treatment

There are three options for surgical treatment of prostate cancer: radical prostatectomy, cryosurgery, and (least commonly) transurethral resection of the prostate (TURP). Non-surgical treatment options for prostate cancer include: external beam radiation, brachytherapy (internal radiation therapy), strontium 89, hormone therapy, chemotherapy, expectant therapy (watch and wait), and clinical trials. (RICAN)

The percent of prostate cancer cases in RI ACOS-approved treatment programs and the percent staged with AJCC staging methodology is detailed below.

Figure 13-6. Prostate cancer in ACOS programs by year

Percent of prostate cancer cases treated in ACOS approved cancer treatment programs by year among males, RI, 1989-2000.

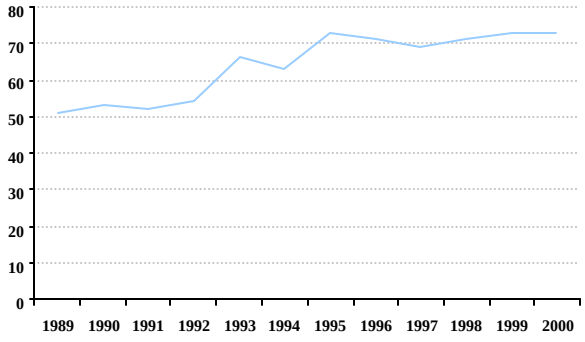


Source: RICR, HEALTH

The percent of prostate cancer case reports from ACOS approved hospital cancer treatment programs in RI averaged 59% in 1989-1991, increased to 78% in 1992, hovered just below 80% from 1992 to 1998 and by 2000 had increased to 88%.

Figure 13-7. Prostate cancer with AJCC staging by year

Percent of prostate cancer cases staged with AJCC staging methodology by year among males, RI, 1989-2000.



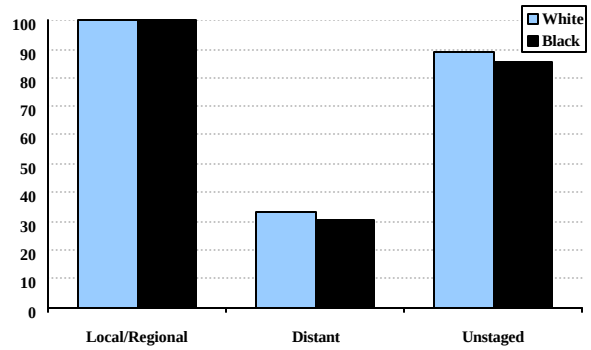
Source: RICR, HEALTH

Prior to a change in the Rules and Regulations of the Rhode Island Cancer Registry in 1992, only about half (51%-54%) of the prostate cancer cases newly diagnosed among RI males were staged using the AJCC system. After the Rules changed, the proportion of cases with AJCC staging increased to 66 % (1993), and has averaged 70% from 1993 through 2000.

Survival

Figure 13-8. Prostate cancer survival rates by race and stage

Five year relative invasive prostate cancer survival rates by race and stage of disease at diagnosis among males, US, 1992-1999.*



* Survival rates are relative rates expressed as percents.
Source: *SEER Cancer Statistics Review, 1975 -2000.*

Based on US data from 1992-1999, five-year relative survival rates for prostate cancer are higher when diagnosed at earlier stages of disease. Prostate cancers diagnosed while localized or regional have a five-year survival rate of 100% among both white and black males. Cancers that are not diagnosed until a distant stage have a five-year survival rate of 33% among whites and 30% among blacks.

Discussion

Summary of Burden

Prostate cancer contributes substantially to the burden of cancer in Rhode Island.

Among Rhode Island men, prostate cancer is the most commonly diagnosed cancer, and the second leading cause of cancer death. Approximately 5,918 males alive today were diagnosed with prostate cancer at some point in the past 25 years.

In Rhode Island, the incidence of prostate cancer increased in the 1990's, probably due to an increase in screening.

Incidence of invasive prostate cancer in RI increased by 50%, from 118 to 177 cases per 100,000 over the period 1989-1999. Although other factors, such as an increase in operations for benign disease of the prostate (NIH), may have contributed to the increase in diagnosed prostate cancer observed in the 1990s, the introduction of the prostate specific antigen (PSA) screening test in the late 1980's is likely responsible for the observed upward trend in prostate cancer incidence. This trend was affected by the timing and proportions of men who were offered the new test and who elected to use it, and probably does not reflect a change in the underlying rate at which new prostate tumors develop.

In Rhode Island, low prostate cancer mortality in the late 1990's may suggest the beginning of a decline.

Prostate cancer mortality varied little until around 1997 when lower rates suggested the beginning of a decline.

Relative Burden

In the early 1990's prostate cancer incidence was lower in Rhode Island than in the nation as a whole. This differential had disappeared with the late 1990's.

Recent trends in prostate cancer incidence in Rhode Island and the United States suggest the influence of a screening innovation. A comparison of Rhode Island and United States rates suggests that the screening innovation (the PSA test) was introduced earlier and more aggressively in other parts of the nation than in Rhode Island.

Disparities

In Rhode Island, black men are more than two times as likely than white men to die from prostate cancer.

This disparity is also seen at the national level. Reasons for this differential are currently unknown and deserve further investigation.

Status of Control Strategies

The burden of prostate cancer may be reduced by assuring state-of-the-art treatment for all prostate cancer patients. [Unproven, but suggested by limited clinical studies:] It is possible that the burden of prostate cancer may be reduced in high-risk populations by screening with the PSA test. Known high-risk populations include black men ages 40 and over and other men with a strong family history of prostate cancer.

Ways to obtain information on the use of prostate cancer screening tests among high-risk men are currently being explored.

By the year 2000, 9 out of 10 prostate cancer case reports in Rhode Island were from American College of Surgeons (ACOS) approved hospitals.

In Rhode Island, the proportion of prostate tumors staged with American Joint Committee on Cancer (AJCC) methodology increased from 51% to 73% in the 1990's.

Cancer Control Priorities for 2004

Reduce the burden of prostate cancer by increasing the proportion of prostate cancer patients who receive state-of-the-art treatment.

Reduce the burden of prostate cancer (and begin to eliminate racial disparities in prostate cancer mortality) by increasing the proportion of high-risk men screened regularly with the PSA test.

Black men ages 40 and over should be the primary focus of any such efforts because of their high prostate cancer mortality rates.

Monitor the literature on the effectiveness of prostate cancer screening.

Ongoing studies may help to clarify whether or not prostate cancer screening reduces the burden of this disease.

SPECIAL STUDIES

Cancer Rates Among Rhode Island Hispanics

Introduction

The 2000 US Census enumerated more than 85,000 persons in Rhode Island who self-identified as Hispanic, representing about 8.5% of the state's total population and comprising the state's largest racial or ethnic minority group. Producing regular health statistics for Hispanics is challenging because ethnicity is difficult to measure in health surveillance systems of even the best design. Here we have evaluated the ability of two major surveillance systems, the Rhode Island Cancer Registry and the Vital Records death certificate file, to measure cancer morbidity and mortality among resident Hispanics.

Methods

Because Census Bureau inter-censal estimates of the number of resident Rhode Island Hispanics were inconsistent with counts from the 2000 US Census, new inter-censal estimates were constructed for resident Rhode Island Hispanics by year, sex, and age group for the years 1989-1998, using linear interpolation and extrapolation from 1990 and 2000 Census counts.

Data on resident cancer cases and deaths identified as Hispanic were extracted from Cancer Registry case reports and from Vital Records death certificates for the ten years 1989-1998 and aggregated by age group, sex, and year of event.

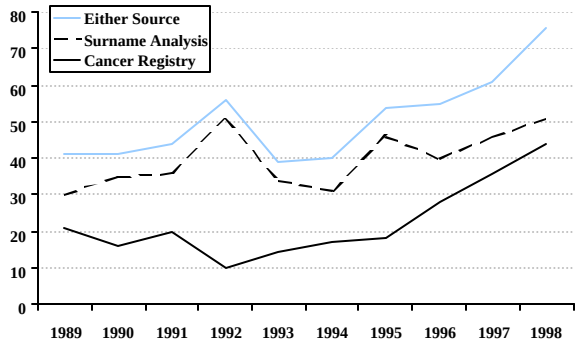
Alternative counts of cases and deaths for resident Rhode Island Hispanics were estimated using a validated US Census technique for identifying Hispanics by surname. (Word)For resident males, data on surname from cancer case reports and from death certificates with cancer as the cause of death for the years 1989-1998 were searched for any of "639 most frequently occurring heavily Hispanic surnames" identified by the Bureau of the Census. ("Heavily Hispanic" means that 75% or more of the people with a particular surname self-identified as Hispanic on the survey.) For resident females, data on father's surname from death certificates with cancer as the cause of death for the years 1989-1998 were searched for any of the 639 names. (Data on father's surname are not available on Rhode Island Cancer Registry case reports.)

Synthetic aggregates of Hispanic cancer cases and cancer deaths were created by adding the additional cases and deaths classified as Hispanic on the basis of the surname analysis to those deaths identified as Hispanic in case reports and on death certificates. These estimates were combined with the estimates of the Hispanic population of Rhode Island for 1989-1998 to construct age-adjusted cancer incidence rates (males only) and age-adjusted cancer mortality rates (males and females). The year 2000 standard US population was used for age-adjustment.

The synthetic aggregates of Hispanic cancer cases were also used to examine the proportion of cancer cases by anatomic site, comparing them with similar data for the Rhode Island population as a whole.

Figure 14-1. Hispanic male cancer cases by data source and year

Annual number of newly diagnosed cancers by data source and year among resident Hispanic males, RI, 1989-1998.

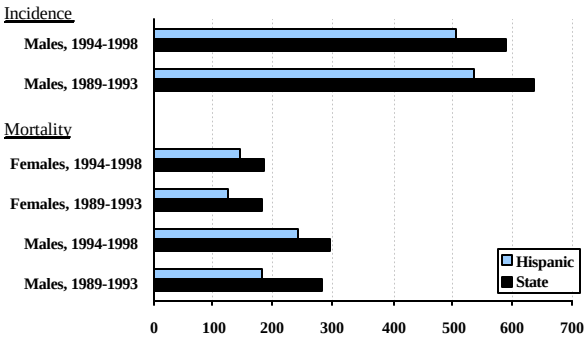


Source: RICR, HEALTH; surname analysis technique from Word.

Over the ten-year period examined, a total of 507 diagnosed cases of cancer were identified among Hispanic males, identified either from case reports or from the surname analysis. Of these, 224 (44.2%) were identified from case reports, and an additional 283 (55.8%) were identified only by Hispanic surname. By year, aggregation of cases from the two methods more than doubled the number of cases originally reported to the Cancer Registry as Hispanic in the first eight years of observation, and enhanced case counts substantially in 1997 and 1998 as well. The number of cancer deaths among Hispanic males and females during this period showed similar enhancements from the surname analysis.

Figure 14-2. Hispanic and all resident cancer rates by year and sex

Average annual cancer rates for all cancers combined by year and sex among Hispanics and all residents, RI, 1989-1998.*

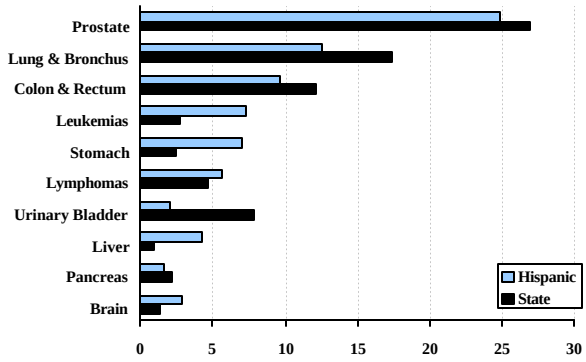


* Rates are age-adjusted to the year 2000 US standard population, expressed as cases/deaths per 100,000 population.
Data source: RICR, HEALTH; Office of Vital Records, HEALTH; surname analysis technique from Word.

The figure at left presents age-adjusted cancer incidence and mortality rates for resident RI Hispanic males and age-adjusted cancer mortality rates for resident RI Hispanic females in 1989-1993 and in 1994-1998, along with comparable rates for the state as a whole. In all comparisons, Hispanics have age-adjusted cancer rates that fall near but below age-adjusted cancer rates for the state as a whole.

Figure 14-3. Male Hispanic and all resident cancer cases by site

Average annual percentage of all newly diagnosed cancers by anatomic site among Hispanics males versus all resident males, RI, 1994-1998.



Data source: RICR, HEALTH; surname analysis technique from Word.

The three most frequently occurring cancers by anatomical site during 1994-1998 were the same for Hispanic males in RI as for all males: Prostate; lung and bronchus; and colon and rectum. Among other major cancer sites, resident Hispanic males were more likely than resident males overall to develop cancers of the stomach and liver and leukemias, and less likely than resident males overall to develop cancer of lung and bronchus and of the urinary bladder. Patterns for the period 1989-1993 were similar.

Discussion

This analysis of data on cancer incidence and mortality among Hispanic Rhode Island residents supports conclusions concerning both patterns of disease and the reliability of the underlying data.

- The use of an authoritative list of Hispanic surnames to augment Hispanic origin information on cancer registry case reports and death certificates approximately doubles the number of cancer cases that are presumably Hispanic in each of the two databases. Thus, these reporting systems are substantially understating the extent of cancer in this population.
- Based on the rates produced from the synthetic aggregates, Hispanic cancer rates are generally similar to statewide cancer rates for all sites.
- The site distribution for cancer incidence among male Hispanics follows the statewide distribution with two divergences worth noting. The observed higher proportions of stomach and liver cancers may be linked to the dietary patterns and infectious disease patterns (e.g., Hepatitis B) in developing countries and in immigrants from those countries. The high proportion of leukemias is consistent with a population whose age distribution is heavily weighted towards the very young.

Healthy People 2010 set a national goal of eliminating health disparities, in particular among disadvantaged racial and ethnic populations. (HP)To support the accomplishment of this sweeping goal, public health surveillance data must have accurate and consistent reporting of race and ethnicity. The Rhode Island Department of Health has recently revised its policy on the collection of data on race and ethnicity and intends to improve the quality of the collected data as the changes in policy are implemented. (Buechner)The findings of this analysis show the clear need for such quality improvement efforts.

Cancer Mortality in Rhode Island, an Old Urban State

Previous analyses (Fulton1, Fulton2) established that Rhode Island (RI) cancer mortality, among the highest in the United States (US), displays an "urban profile." (Greenberg) In brief, RI, one of the most urban states, has experienced higher rates of cancer mortality than the nation over a period of at least five decades. When this differential is decomposed, it is found to be caused by cancers of a limited number of anatomical sites, including cancers in which diet is implicated and cancers related to tobacco use. Mortality rates from these cancers are elevated in urban areas throughout the developed world. (Greenberg)

The Rhode Island Department of Health extended earlier analyses with the addition of data on cancer mortality during 1990-1999 for both RI and the US. Findings relating to trends over the period 1970-1999 and relating to differences between RI and US rates are discussed.

Methods

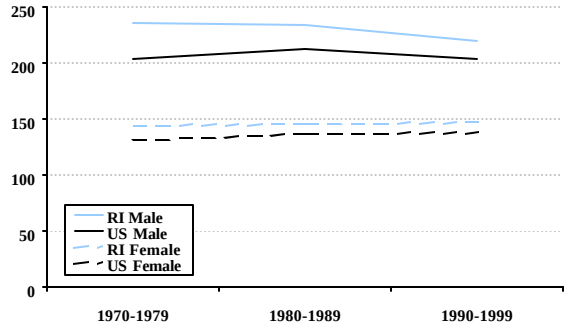
RI and US cancer mortality rates for 1970-1999 were obtained from the National Cancer Institute's SEER Incidence and US Mortality Statistics. (SEER Incidence, SEER Mortality) All rates, published and derived, are directly standardized for age, using the 1970 population of the US as the standard population, and are expressed as "average annual deaths per 100,000 population per year." They are specific for race and gender, and are grouped by decade.

The percent elevation (RI rate relative to US rate) of mortality caused by tobacco-related cancers was determined using cancers of the lung-bronchus, urinary bladder, esophagus, oral cavity, pharynx, and larynx. The sites used to determine percent elevation for cancers in which diet is implicated include cancers of the colon-rectum, stomach, breast among females, and prostate among males.

All results are based on cancer deaths among whites only. RI and US African-American cancer mortality rates were not available for the years 1970-1979 (race-specific rates only identified white and non-white). Also, RI rates for all races other than white and for Hispanics are based on small numbers of deaths, which are associated with large standard errors.

Figure 14-4. Cancer mortality for all cancers combined by sex and decade

Cancer mortality rates for all cancers combined by sex and decade, RI and US, 1970-1999.*



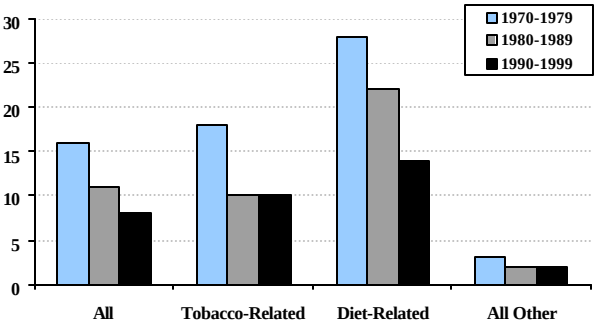
* Rates are age-adjusted to the year 1970 US standard population, expressed as deaths per 100,000 population.
Source: SEER US Mortality 1969-2000 Data; SEER web query system.

Among white males in RI, trends in mortality from all cancers combined decreased from the 1970s to the 1980s, the first decrease since at least the 1950s, and continued to decline into the 1990s. Among white males in the US, all-cancer mortality rates increased from the 1970s to the 1980s, and in the 1990s, also exhibited a decrease for the first time since at least the 1950s. RI rates were higher than US rates in each of the decades observed. Overall, from the 1970s to the 1990s, RI all-cancer mortality rates decreased by 6.7% and US rates decreased by less than 1%. The decline in cancer death rates was driven by decreases among diet-related cancers (down 21.2% in RI and 12.0% in the US) and, in RI, among tobacco-related cancers (down 5.0%). For the US, tobacco-related cancer deaths were 1.8% higher in the 1990s than the 1970s, and 5.1% lower than in the 1980s.

All-cancer mortality rates for white females were higher in RI than in the US during each decade from 1970 through 1999. In both geographical areas, rates increased from the 1970s through the 1990s. With an overall increase of 5.3%, the increase in US white female cancer mortality rates was more substantial than the 2.4% increase in RI rates. Decreases in diet-related cancers (down 26.6% in RI and 19.3% in the US) were largely offset by increases in tobacco related cancers (up 98.6% in RI and 88.4% in the US).

Figure 14-5. Percent elevation in white male cancer mortality by cancer site group and decade

Percent elevation in cancer mortality rates by cancer site group and decade among white males, RI relative to the US, 1970-1999.*

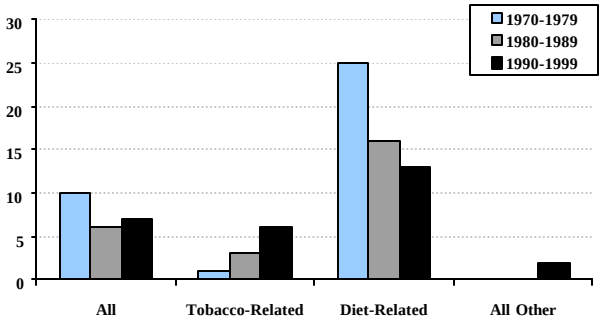


* Rates are age-adjusted to the year 1970 US standard population, expressed as deaths per 100,000 population.
Source: SEER US Mortality 1969-2000 Data; SEER web query system.

Among white males, the percent elevation of RI mortality rates relative to US rates for all-cancer mortality decreased from the 1970s through the 1990s. This decline was driven by decreases in the RI elevation of tobacco-related cancer mortality (down from 18% in the 1970s to 10% in the 1990s) and diet-related cancer mortality (down from 28% to 14%). Mortality from all other cancers was elevated only slightly in the 1970s, 1980s, and 1990s. Despite the decreasing trend in the percent elevation, RI tobacco- and diet-related cancer death rates remain higher than those of the US.

Figure 14-6. Percent elevation in white female cancer mortality by cancer site group and decade

Percent elevation in cancer mortality rates by cancer site group and decade among white females, RI relative to the US, 1970-1999.*



* Rates are age-adjusted to the year 1970 US standard population, expressed as deaths per 100,000 population.
Source: SEER US Mortality 1969-2000 Data; SEER web query system.

Among RI white females, the percent elevation over the US in all-cancer mortality decreased from the 1970s to the 1980s, and changed little from the 1980s to the 1990s. This decline was driven by a reduced elevation of diet-related cancers (down from 25% in the 1970s to 13% in the 1990s) and partly offset by a less substantial but growing elevation in tobacco-related cancers (up from 1% in 1970s to 6% in the 1990s). Mortality from all other cancers was elevated only slightly in the 1970s, 1980s, and 1990s. Despite the decreasing trend in elevated diet-related cancer deaths, RI rates are still higher than those of the US. Also, the RI elevation versus the US for tobacco-related cancer deaths among white females has increased over the three decades examined.

Discussion

During the 1990s, Rhode Island continued to exhibit an "urban profile" in the cancer mortality rates among its white residents. However, for both males and females, the level of elevation in mortality relative to the US was lower than in previous decades. The decline in the level of elevation was greatest for cancer sites related to diet for both males and females and for cancer sites related to tobacco for males.

In addition, for the first time since mid-century, the age-adjusted all-cancer mortality rate for white males fell from one decade to the next in the 1980s in RI and in the 1990s in the US. Mortality from tobacco-related cancers also fell during the 1990s among males. Among both males and females, mortality from diet-related cancers fell during the 1990s in both RI and the US.

The improvements in cancer mortality, especially those related to diet and tobacco, likely reflect changes in risk behaviors in the underlying populations that were accomplished decades earlier. In the case of Rhode Island, the achievement of lower absolute mortality rates, as well as lower rates relative to the national experience, strongly suggests that the state's residents have adopted healthier lifestyles that will continue to reduce the state's historically high burden of mortality and morbidity from cancer.

Cancer Incidence in Rhode Island Cities and Towns

Since the recording of its first cancer case reports in October 1986 the Rhode Island Cancer Registry (RICR) of the Rhode Island Department of Health has been asked by various sources to produce cancer incidence rates for municipalities. Doing so requires at least ten years of cancer case reports and appropriate population data from censuses of the state's population. With the recent release of detailed demographic information for municipalities from the United States Census of 2000, it has become possible for the first time to produce cancer incidence rates for the 39 cities and towns of Rhode Island.

Methods

Counts of malignant neoplasms diagnosed between January 1, 1987, and December 31, 2000, categorized by age, sex, anatomical site, and municipality were prepared from cancer case reports made to the RICR. Municipality of residence at diagnosis was ascertained from three separate data fields: municipality, census tract, and zip code. Of 76,331 cases of malignant neoplasms diagnosed between January 1, 1987, and December 31, 2000, municipality of residence at diagnosis could be ascertained unambiguously in 97 percent. Another 0.2 percent included place names and corresponding zip codes that overlap more than one municipality. In these cases, the municipality identified as "primary" for the zip code by the United States Postal Service was selected for use, or absent this information, the largest municipality associated with the place. The remaining cases (slightly less than three percent) contained no useful information on municipality of residence at diagnosis. To avoid underestimating incidence rates, these cases were randomly assigned to municipalities in proportion to the populations of the municipalities in the United States Census of 2000.

Counts of the Rhode Island population by age, sex, and municipality were obtained from publications of the 1990 and 2000 United States Censuses of Population. (CINA) Analogous counts were estimated for the years 1991-1999 by linear interpolation, and for the years 1987-1989 by linear projection, using data from the two censuses.

Age-adjusted sex-specific statewide and municipal cancer incidence rates were calculated from cancer case reports, actual and estimated counts of the Rhode Island population, and the Year 2000 United States Standard Population. (Census) Rates were calculated for all cancers combined and for the four most common malignancies, cancers of the colon-rectum ("colon"), lung-bronchus ("lung"), prostate (males only), and breast (females only).

Table 14-6. Statewide and municipal cancer mortality rates

Average annual sex-specific statewide and municipal cancer mortality rates, RI, 1987-2000.*

	Males				Females			
Municipality	Colon	Lung	Prostate	All**	Colon	Lung	Breast	All**
State	33.5	89.7	35.2	284.3	21.6	40.8	33.6	181.4

Table 14-7. Statewide and municipal cancer incidence rates by site and sex

Please refer to **Appendix: Supplemental Tables** (section 17) for data.

Cumberland	29.8	72.7	36.3	236.7	21.0	30.5	32.5	157.8
East Greenwich	24.2	55.6	24.6	197.3	17.1	24.5	29.7	137.3
East Providence	29.7	72.9	27.2	233.6	17.6	33.6	27.9	152.3
Exeter	10.9	79.1	30.7	189.3	8.7	48.7	24.8	148.7
Foster	17.1	63.7	27.9	147.8	6.9	45.2	20.9	124.4
Glocester	23.1	59.6	29.1	181.1	8.4	25.8	31.6	145.0
Hopkinton	27.0	61.6	17.1	181.0	15.1	26.3	12.9	110.1
Jamestown	19.3	33.4	37.2	189.3	23.3	27.4	35.9	155.7
Johnston	23.1	72.3	27.5	215.4	12.5	32.6	25.8	139.0

The statewide age-adjusted cancer incidence rate for all cancers combined is 601.4 per 100,000 among males and 435.7 per 100,000 among females. (Table 1) By municipality, rates among males vary from 449.0 for Exeter to 726.1 for East Greenwich, with a standard deviation of 59.2 over the 39 cities and towns. (Table 1) Municipal cancer incidence rates for all cancers combined among females vary from 331.8 for Richmond to 512.4 for Hopkinton, with a standard deviation of 39.8 over the 39 cities and towns.

Table 14-6. Statewide and municipal cancer mortality rates

Average annual sex-specific statewide and municipal cancer mortality rates, RI, 1987-2000.*

	Males				Females			
Municipality	Colon	Lung	Prostate	All**	Colon	Lung	Breast	All**
State	33.5	89.7	35.2	284.3	21.6	40.8	33.6	181.4

Table 14-8. Statewide cancer incidence rates and standard deviations of municipal rates by site and sex

Please refer to **Appendix: Supplemental Tables** (section 17) for data.

Cumberland	29.8	72.7	36.3	236.7	21.0	30.5	32.5	157.8
East Greenwich	24.2	55.6	24.6	197.3	17.1	24.5	29.7	137.3
East Providence	29.7	72.9	27.2	233.6	17.6	33.6	27.9	152.3
Exeter	10.9	79.1	30.7	189.3	8.7	48.7	24.8	148.7
Foster	17.1	63.7	27.9	147.8	6.9	45.2	20.9	124.4
Glocester	23.1	59.6	29.1	181.1	8.4	25.8	31.6	145.0
Hopkinton	27.0	61.6	17.1	181.0	15.1	26.3	12.9	110.1
Jamestown	19.3	33.4	37.2	189.3	23.3	27.4	35.9	155.7
Johnston	23.1	72.3	27.5	215.4	12.5	32.6	25.8	139.0

Measured relative to statewide incidence rates, the standard deviations of the municipal rates for all cancers combined were 9.8% for males and 9.1% for females. (Table 2) Municipal cancer incidence rates for the four most common site-specific cancers vary more widely over 39 cities and towns. Their standard deviations range from 15.8% to 22.6% of the corresponding statewide rates.

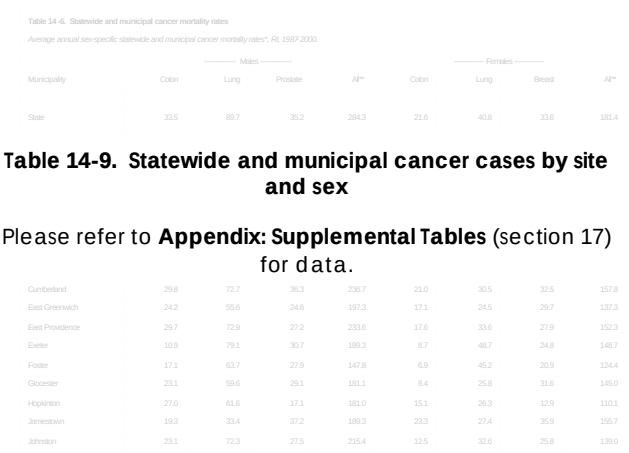


Table 14-6. Statewide and municipal cancer mortality rates

Average annual sex-specific statewide and municipal cancer mortality rates*, RI, 1987-2000.

	Males				Females			
Municipality	Colon	Lung	Prostate	All**	Colon	Lung	Breast	All**
State	33.5	89.7	35.2	284.3	21.6	40.8	33.6	181.4
Cumberland	29.8	72.7	36.3	236.7	21.0	30.5	32.5	157.8
East Greenwich	24.2	55.6	24.6	197.3	17.1	24.5	29.7	137.3
East Providence	29.7	72.9	27.2	233.6	17.6	33.6	27.9	152.3
Exeter	10.9	79.1	30.7	189.3	8.7	48.7	24.8	148.7
Foster	17.1	63.7	27.9	147.8	6.9	45.2	20.9	124.4
Glocester	23.1	59.6	29.1	181.1	8.4	25.8	31.6	145.0
Hopkinton	27.0	61.6	17.1	181.0	15.1	26.3	12.9	110.1
Jamestown	19.3	33.4	37.2	189.3	23.3	27.4	35.9	155.7
Johnston	23.1	72.3	27.5	215.4	12.5	32.6	25.8	139.0

Table 14-9. Statewide and municipal cancer cases by site and sex

Please refer to **Appendix: Supplemental Tables** (section 17) for data.

A caution that should be observed in comparing rates across geographic entities with small populations is that random factors (factors unrelated to the cause of cancer or their control) are more likely to influence cancer incidence rates in smaller populations, where the numbers of cases are relatively small, than in larger populations. (Table 3)

Discussion

Cancer is a major cause of morbidity and mortality in Rhode Island, as it is in the United States as a whole. About four out of every 10 people in Rhode Island will develop cancer sometime in the course of their lives, and half of them will die of the disease. Close to four percent of the state's population (nearly 40,000 people) suffer from cancer at any one time.

Cancer is considered a public health problem because some cancers are preventable, and others controllable, through environmental or population-based interventions. For this reason, the United States (HP) and Rhode Island (Plan) both have established clearly articulated cancer control objectives for their populations.

Among the many different forms of cancer that beset humans, cancers of four anatomical sites clearly predominate in the United States: 1) cancer of the colon-rectum, 2) cancer of the lung, 3) cancer of the prostate (males), and 4) cancer of the breast (predominantly females). Of these four, the first two are largely preventable, and the last two are more easily controlled if identified as small tumors. For this reason, all four figure prominently in cancer control objectives, using population-based prevention and early detection strategies proven to be effective in research studies. (HP, Plan)

The relative effect of proven cancer control interventions from place to place may be examined by comparing cancer incidence rates computed from cancer registry data. Examining differentials in cancer incidence rates by municipality, for example, may be helpful in targeting local cancer control interventions. For example, municipalities with high lung cancer incidence rates might consider targeting the reduction of tobacco use, while those with high colorectal incidence rates might consider ways of increasing the proportion of eligible persons receiving endoscopic exams of the colon. On the other hand, municipalities with low prostate cancer incidence rates or low breast cancer incidence rates might consider ways of promoting screening tests for these cancers.

A caution that should be observed in comparing rates across geographic entities with small populations is that random factors (factors unrelated to the cause of cancer or their control) are more likely to influence cancer incidence rates in smaller populations, where the numbers of cases are relatively small, than in larger populations. Nonetheless, when interpreted judiciously,

municipal cancer rates serve as a good introduction to more comprehensive thinking about the factors that cause and reduce the cancer burden (incidence, prevalence, and mortality) across geographic areas.

Cancer Mortality in Rhode Island Cities and Towns

In support of local cancer control task forces in Rhode Island, the Rhode Island Cancer Registry of the Rhode Island Department of Health (HEALTH) has constructed cancer mortality rates for 39 municipalities, using death reports made to HEALTH over the 14 years 1987-2000, and population data from the U.S. censuses of 1990 and 2000.

Background

In the period 1987-2000, Rhode Island's average annual, age-adjusted, gender-specific mortality rates for all malignant neoplasms (males: 284.3 per 100,000; females: 181.4 per 100,000) exceeded New England's rates (males: 273.2 per 100,000; females: 179.5 per 100,000), which in turn exceeded national rates (males: 268.0 per 100,000; females: 171.7 per 100,000). These differentials, observed for more than fifty years, have decreased over time, especially in the last 15 years of observation, and especially for women.

Methods

Counts of Rhode Island resident deaths from malignant neoplasms occurring between January 1, 1987, and December 31, 2000, categorized by age, gender, cause of death, and municipality were prepared from death reports made to HEALTH.

Counts of the Rhode Island population by age, gender, and municipality were obtained from publications of the 1990 and 2000 United States Censuses of Population. (Census) Analogous counts were estimated for the years 1991-1999 by linear interpolation, and for the years 1987-1989 by linear projection, using data from the two censuses.

Average annual, age-adjusted, gender-specific statewide and municipal cancer mortality rates were calculated from cancer death reports, actual and estimated counts of the Rhode Island population, and the year 2000 United States Standard Population. (CINA) The rates are expressed as "deaths per 100,000 population." Ninety-five percent confidence intervals were calculated for each municipal rate, and compared with the overall state rate, by gender. Statistically significant ($P < 0.05$) differences between state and municipal rates were noted.

Results

Table 14-6. Statewide and municipal cancer mortality rates

Average annual sex-specific statewide and municipal cancer mortality rates*, RI, 1987-2000.

	Males				Females			
Municipality	Colon	Lung	Prostate	All**	Colon	Lung	Breast	All**
State	33.5	89.7	35.2	284.3	21.6	40.8	33.6	181.4

Table 14-10. Statewide and municipal cancer mortality rates with standard errors and 95% confidence limits by sex

Please refer to **Appendix: Supplemental Tables** (section 17) for data.

Cumberland	29.8	72.7	36.3	236.7	21.0	30.5	32.5	157.8
East Greenwich	24.2	55.6	24.6	197.3	17.1	24.5	29.7	137.3
East Providence	29.7	72.9	27.2	233.6	17.6	33.6	27.9	152.3
Exeter	10.9	79.1	30.7	189.3	8.7	48.7	24.8	148.7
Foster	17.1	63.7	27.9	147.8	6.9	45.2	20.9	124.4
Glocester	23.1	59.6	29.1	181.1	8.4	25.8	31.6	145.0
Hopkinton	27.0	61.6	17.1	181.0	15.1	26.3	12.9	110.1
Jamestown	19.3	33.4	37.2	189.3	23.3	27.4	35.9	155.7
Johnston	23.1	72.3	27.5	215.4	12.5	32.6	25.8	139.0

The statewide age-adjusted cancer mortality rate for all cancers combined is 284.3 per 100,000 among males and 181.4 per 100,000 among females. By municipality, rates among males vary from 197.3 per 100,000 for East Greenwich to 382.0 per 100,000 for New Shoreham, and rates among females vary from 136.6 per 100,000 for East Greenwich to 246.5 per 100,000 for New Shoreham.

Generally, Rhode Island's municipal-level cancer mortality rates have wide confidence limits, thus limiting their usefulness in identifying disparities at this level of geographical analysis. Among 78 possible gender-specific municipal-to-state comparisons, five are statistically significant at the $P < 0.05$, including:

1. lower-than-state rates for males residing in East Greenwich
2. lower-than-state rates for females residing in East Greenwich
3. lower-than-state rates for females residing in Bristol
4. higher-than-state rates for females residing in Warwick
5. higher-than-state rates for males residing in Woonsocket

Discussion

Cancer is a major cause of mortality in Rhode Island, as it is in the United States as a whole. Between two and three of every ten people in Rhode Island will die of the disease. Cancer death rates vary widely at the municipal level, but, with few exceptions, cannot be used to identify disparities among cities and towns because of statistical imprecision, as indicated by large standard errors and wide confidence limits. "Finer" analyses, of time trends or of rates for individual cancers, for example, would be even less productive of statistically significant differentials among municipal cancer mortality rates.

The five statistically significant differences found between two gender-specific state rates and 78 gender-specific municipal rates will be examined more closely, using data from various sources to try to explain higher or lower rates, recognizing that the differences may have been caused by random fluctuations in the distribution of cancer deaths throughout the state. (Note: 80 tests of statistical significance at the $P < 0.05$ probability level are expected to yield about four statistically significant results on the basis of chance, alone.)

In the meantime, we must work vigorously and consistently to apply basic cancer control strategies from Cancer Control Rhode Island: Strategic Plan for 1998-2005 (Plan) and from *Healthy People 2010* (HP):

- Prevent tobacco use; promote quitting among users.

- Screen eligibles for cancers of the cervix, breast, and colon-rectum.
- Identify people at high risk for cancers of the cervix, breast, ovary, prostate, colon-rectum, skin, and oral cavity; examine high-risk people regularly.
- Support American College of Surgeons approved hospital cancer programs.
- Assure state-of-the-art cancer care for all cancer patients; ascertain the eligibility of all cancer patients for clinical trials; promote enrollment in clinical trials.
- Promote the full use of hospice benefits for terminally ill cancer patients.

THE RHODE ISLAND RESPONSE TO CANCER

After reviewing several known strategies for cancer control, the burden of cancer to Rhode Islanders, and the national 2010 objectives, objectives were selected in the following four key areas to address the RI problem: (1) Cancer Surveillance; (2) Cancer Prevention; (3) Cancer Screening; and (4) Cancer Treatment.

Cancer Surveillance

The overall goal for this intervention is to improve cancer surveillance in Rhode Island. This will be accomplished through four objectives: enhance the infrastructure of cancer surveillance in RI; conduct timely and comprehensive cancer surveillance; increase the dissemination of cancer control data; and develop additional cancer control surveillance capacity.

Cancer Prevention

RI has several existing and proposed programs that aim to prevent cancer. These programs, each with their own set of goals and objectives, include:

- *Tobacco control* – Use of tobacco smoke is related to, among other things, lung cancer. The RI Tobacco Control Program addresses smoking as a major health problem. The goals of this program include tobacco prevention among youth, smoking cessation, elimination of environmental tobacco smoke, and elimination of tobacco use disparities.

- *Cervical cancer prevention* – The focus of cervical cancer prevention is the promotion of safe sex. Although there is no program directly related to cervical cancer prevention, the Office of Communicable Diseases promotes abstaining from sexual intercourse, limiting relationships to those between mutually monogamous partners, and using latex condoms during sexual activity.

- *Obesity control* – The foci of obesity control are nutrition and physical activity. Poor diets and sedentary lifestyles have been related to several cancers. The RI Obesity Control Program aims to reduce obesity and related chronic diseases. This goal will be reached through the development of a "statewide system to implement and evaluate nutrition and physical activity programs within priority communities,"

- *Skin cancer prevention* – The focus of skin cancer prevention is to reduce exposure to ultraviolet light. Skin cancer prevention (and skin cancer screening) is a part of the proposed skin cancer program. The goal of the prevention aspect of this program would be to reduce skin cancer by promoting healthy skincare behaviors.

Cancer Screening

RI has several existing and proposed programs that promote cancer screening. These programs, each with their own objectives, include:

- *Breast cancer screening* – RI Women's Cancer Screening Program provides free breast cancer (and cervical cancer) screening services for RI females who are 50 or older, uninsured or underinsured, and with incomes at or less than 250% of the poverty level. The goal for the breast cancer aspect of this program is to reduce the burden of breast

cancer in Rhode Island by increasing the percentage of females who receive a mammogram.

- *Cervical cancer screening* – RI Women's Cancer Screening Program provides free cervical cancer (and breast cancer) screening services for RI females who are 50 or older, uninsured or underinsured, and with incomes at or less than 250% of the poverty level. The goal for the cervical cancer aspect of this program is to reduce the burden of cervical cancer in Rhode Island by increasing the percentage of females who receive a pap smear.

- *Colorectal cancer screening* – Colorectal cancer screening is a part of the proposed colorectal cancer program. The goal of this program would be to reduce colorectal cancer by promoting screening exams (sigmoidoscopy, colonoscopy, and proctoscopic exam) through professional education and public education.

- *Prostate cancer screening* – Prostate cancer screening (and treatment) is a part of the proposed prostate cancer program. The goal of this program would be to reduce prostate cancer by assuring that all eligible males are informed about the risks and benefits of prostate cancer screening, and that screening is available to all males who request to be screened.

- *Ovarian cancer* – Ovarian cancer screening is a part of the proposed ovarian cancer program. The goal of this program would be to increase awareness of risk factors for ovarian cancer, and to promote genetic testing among high-risk populations.

- *Skin cancer* screening – Skin cancer screening (and prevention) is a part of the proposed skin cancer program. The goal of this program would be to reduce skin cancer by assuring that health care providers and patients perform visual inspections and remain alert for skin lesions.

- *Oral cavity cancer screening* – Oropharyngeal cancer screening is a part of the oral health program. The screening goal of this program is to reduce oropharyngeal cancer by assuring that health care providers and patients perform visual inspections and remain alert for lesions in the oral cavity.

Cancer Treatment

The overall goal for this intervention is to improve cancer treatment in Rhode Island. This will be accomplished through five objectives: support state-of-the-art breast cancer treatment through development and dissemination of a breast cancer treatment algorithm; support state-of-the-art colorectal cancer treatment through development and dissemination of a colorectal cancer treatment algorithm; increase enrollment in clinical trials; promote and support the adoption of American College of Surgeons (ACOS) approved cancer programs in all acute care hospitals; and assure accurate tumor staging with American Joint Committee on Cancer (AJCC) staging methodology.

Palliative care

The overall goal for this intervention is to increase the use of palliative care services in Rhode Island. This will be accomplished through one objective: develop a campaign to increase awareness among patients and family caregivers about hospice care options.

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APPENDIX: SUPPLEMENTAL TABLES

The table numbers in this appendix are correlated with figure numbers throughout the document.

Cancer in Rhode Island: Cancer Trends

Table 5-1. Cancer incidence by year and sex for all cancers combined

Annual invasive cancer incidence rates** for all cancers combined, RI and US, 1973-2000.*

Male

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
RI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	566.4
US	448.5	457.9	466.4	480.9	486.3	488.3	496.2	505.4	510.6	510.7	519.6	525.1	530.7	537.9	562.8
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	
RI	559.7	535.0	561.3	596.3	614.1	625.5	609.5	616.9	636.9	634.0	623.8	631.5	645.8	633.7	
US	557.9	566.5	592.0	636.5	656.8	620.6	587.9	568.7	568.2	570.5	566.0	569.1	560.2	-	

Female

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
RI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	407.1
US	349.5	370.5	365.8	367.2	363.4	362.1	365.3	367.6	376.8	375.9	380.4	392.0	402.8	402.0	413.2
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	
RI	419.8	411.3	413.4	425.6	433.8	432.6	442.0	446.3	450.6	458.5	446.5	470.3	454.2	428.6	
US	410.9	410.4	417.2	420.4	417.1	410.2	415.2	416.1	418.7	428.3	432.5	426.3	413.8	-	

* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Table 5-2. Cancer mortality by year and sex for all cancers combined

Annual cancer mortality rates for all cancers combined, RI and US, 1969-2000.*

Male

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
RI	288.6	303.1	286.3	280.1	287.6	283.5	294.5	315.3	319.9	307.4	298.1	286.1	297.9	304	308.2	303.3
US	247.6	249.3	251.7	255.4	255.0	257.9	258.4	262.2	264.2	267.1	268.7	271.1	269.8	272.9	274.1	275.1
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
RI	295.4	296.6	283.0	299.6	311.3	295.6	290.3	292.6	274.8	284.8	285.2	284.0	274.5	281.5	260.7	255.6
US	275.7	276.0	276.3	276.9	278.5	279.8	279.1	276.5	275.9	272.1	268.5	263.7	258.1	253.6	252.8	249.8

Female

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
RI	172.0	173.2	174.1	182.1	173.1	165.6	173.5	181.1	189.9	181.0	175.7	177.3	172.5	175.9	180.0	185.9
US	163.2	163.0	162.2	162.7	160.8	161.1	160	162.7	162.9	163.8	163.1	165.8	165.9	167.4	168.3	170.5
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
RI	184.9	182.5	177.5	186.1	179.4	183.9	177.5	187.0	180.0	176.5	182.7	183.5	181.5	173.7	181.2	177.4
US	171.0	171.6	171.5	172.5	174.3	174.6	175.3	174.4	174.5	174.1	173.4	171.2	169.0	166.9	167.2	167.3

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

Cancer in Rhode Island: Cancer Disparities

Table 5-3. Cancer incidence by sex for all cancers combined

Cancer incidence rates by sex for all cancers combined, RI and US, 1996-2000.*

Sex	RI	US
Male	627.0	566.7
Female	452.2	423.9

* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Table 5-4. Cancer mortality by sex for all cancers combined

Cancer mortality rates by sex for all cancers combined, RI and US, 1996-2000.*

Sex	RI	US
Male	270.7	255.5
Female	179.0	168.3

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

Table 5-5. Cancer incidence by age and sex for all cancers combined

Invasive cancer incidence rates** by age and sex for all cancers combined, RI and US, 1996-2000.*

	00-04	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
Male																		
RI	21.1	9.4	20.2	16.1	34.5	42.9	78.3	97.4	173.9	323.9	623.0	1067.6	1905.9	2636.3	3328.2	3596.2	3523.1	3727.2
US	21.5	12.2	13.0	21.0	34.4	49.6	70.5	100.7	159.2	285.0	547.0	993.4	1630.5	2392.4	3046.7	3355.4	3495.3	3441.4
Female																		
RI	24.2	18.8	13.3	19.8	37.4	51.8	110.6	201.4	338.0	527.5	750.9	994.2	1415.0	1586.5	1910.4	2116.9	2160.2	2140.0
US	19.8	9.8	12.2	22.0	42.7	69.5	113.3	188.1	321.1	501.4	708.5	960.6	1225.3	1544.9	1843.0	2040.8	2138.5	1996.7

* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-specific, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Table 5-6. Cancer mortality by age and sex for all cancers combined

Cancer mortality rates by age and sex for all cancers combined, RI and US, 1996-2000.*

	00-04	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
Male																		
RI	1.8	4.4	3.5	3.3	5.8	8.8	11.9	27.8	42.3	94.4	184.9	304.0	570.8	876.5	1328.0	1718.8	2220.3	3170.5
US	2.7	2.7	2.8	4.2	6.1	7.8	12.5	22.4	46.3	95.1	180.8	334.0	561.1	863.5	1232.9	1601.3	2069.3	2716.5
Female																		
RI	1.3	2.9	4.3	2.3	5.8	7.5	14.9	35.0	49.1	102.8	176.1	287.4	453.3	608.8	794.8	1022.4	1205.8	1593.3
US	2.4	2.3	2.3	3.0	4.3	7.4	14.6	29.2	54.8	96.0	164.9	267.2	408.1	572.5	773.8	956.6	1163.9	1423.9

* Rates are age-specific, expressed as deaths per 100,000 population.
Source: SEER US Mortality 1969-2000 Data; SEER web query system.

Table 5-7. Cancer incidence by race and sex for all cancers combined

Cancer incidence rates by race and sex for all cancers combined, RI and US, 1987-2000.*

	---------- Male ----------		---------- Female ---------	
	White	Black	White	Black
RI	631.5	659.1	483.4	438.6
US	604.1	731.9	501.5	460.1

* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Table 5-8. Cancer mortality by race and sex for all cancers combined

Cancer mortality rates by race and sex for all cancers combined, RI and US, 1987-2000.*

	---------- Male ----------		---------- Female ---------	
	White	Black	White	Black
RI	285.8	380.3	183.7	234.3
US	261.0	376.3	170.2	201.8

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

Breast Cancer

Table 6-1. Female breast cancer incidence by year

Average annual invasive breast cancer incidence rates** among females, RI and US, 1987-2001***.*

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
RI	132.6	131.5	130.1	128.8	129.9	130.6	130.8	131.2	131.5	131.1	131.2
US	131.5	131.1	130.7	131.4	131.6	131.6	132.7	135.0	136.6	137.1*	NA

* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1996-2000).
Source: RICR, HEALTH – calculated with *SEER*Stat*; SEER Cancer Statistics Review, 1973-1999;
1998 US data is from SEER Public-Use 1973-2000 Data – calculated with *SEER*Stat*.

Table 6-2. Female breast cancer mortality by year

Average annual breast cancer mortality rates among females, RI and US, 1987-2000***

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
RI	37.2	37.9	36.5	35.6	35.2	34.2	32.2	32.2	31.1	29.2
US	33.0	32.9	32.5	32.1	31.6	31.0	30.4	29.6	28.8	27.7*

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1996-2000).
Source: CDC WONDER, CDC;
1998 US data is from SEER US Mortality 1969-2000 Data – calculated with *SEER*Stat*.

Table 6-3. Female breast cancer incidence by race

Average annual invasive breast cancer incidence rates by race among females, RI and US, 1987-2000.*

	White	Black
RI	156.3	129.0
US	162.9	139.9

* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.

Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat* .

Table 6-4. Female breast cancer mortality by race

Average annual breast cancer mortality rates by race among females, RI and US, 1987-2000.*

	White	Black
RI	34.1	40.5
US	30.1	36.9

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.

Source: RICR, HEALTH; SEER US Mortality 1969-2000 data; calculated with *SEER*Stat* .

Table 6-6. Female breast cancer screening by year

Percent of female respondents, age 40 and older, who report that they have had a mammogram within the past two years, RI and US, 1990-2001.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
RI	71	71	66	73	NA	72	76	81	80	83	84	85
US	58	62	63	66	67	69	69	70	72	73	76	NA

Source: RI-BRFSS, HEALTH; BRFSS, CDC.

Table 6-7. Female breast cancer cases in ACOS programs by year

Percent of breast cancer cases that were or are treated in ACOS-approved cancer treatment programs by year among females, RI, 1989-2000.

1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
52	53	55	70	70	70	69	69	66	81	81	89

Source: RICR, HEALTH.

Table 6-8. Female breast cancer cases with AJCC staging by year

Percent of breast cancer cases staged with AJCC staging methodology by year among females, RI, 1989-2000.

1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
73	74	71	75	90	93	93	94	92	92	92	95

Source: RICR, HEALTH.

Table 6-9. Female breast cancer survival rates by race and stage

*Five-year relative invasive breast cancer survival rate*s by race and stage of disease at diagnosis among females, US, 1992-1999.*

	In situ**	Localized	Regional	Distant	Unstaged
White	100.0	97.6	80.3	24.6	56.3
Black	100.0	89.7	66.0	15.2	52.0

* Survival rates are relative rates expressed as percents.
** In situ cases are not considered invasive.
Source: *SEER Cancer Statistics Review, 1975-2000.*

Cervical Cancer

Table 7-1. Cervical cancer incidence by year

Average annual invasive cervical cancer incidence rates** among females, RI and US, 1987-2001***.*

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
RI	10.0	10.8	11.0	11.2	11.6	11.8	11.4	10.7	10.4	9.7	8.8
US	10.4	10.4	10.2	10.0	9.6	9.5	9.4	9.3	9.0	8.7*	NA

* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1996-2000).
Source: RICR, HEALTH – calculated with *SEER*Stat*; SEER Cancer Statistics Review, 1973-1999;
1998 US data is from SEER Public-Use 1973-2000 Data – calculated with *SEER*Stat*.

Table 7-2. Cervical cancer mortality by year

Average annual cervical cancer mortality rates among females, RI and US, 1987-2000**.*

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
RI	2.6	2.8	3.0	3.0	2.8	3.3	3.2	2.9	2.9	2.8
US	3.6	3.6	3.5	3.5	3.4	3.4	3.3	3.2	3.1	3.0*

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1996-2000).
Source: CDC WONDER, CDC;
1998 US data is from SEER US Mortality 1969-2000 Data – calculated with *SEER*Stat*.

Table 7-3. Cervical cancer incidence by race

Average annual invasive cervical cancer incidence rates by race among females, RI and US, 1987-2000.*

	White	Black
RI	10.2	18.1
US	8.0	12.7

* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Table 7-4. Cervical cancer mortality by race

Average annual cervical cancer mortality rates by race among females, RI and US, 1987-2000.*

	White	Black
RI	2.9	6.4
US	2.9	7.0

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.

Source: RICR, HEALTH; SEER US Mortality 1969-2000 data; calculated with *SEER*Stat*.

Table 7-5. Cervical cancer screening by year

Percent of female respondents, with uterine cervix, age 18 and older, who report that they have had a pap smear within the last three years, RI and US, 1992-2001.

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
RI	80.0	83.9	NA	82.9	82.9	87.4	85.2	86.0	88.5	88.2
US	84.1	84.7	85.4	84.5	84.6	84.6	84.8	85.5	86.8	NA

Source: RI-BRFSS, HEALTH; BRFSS, CDC.

Table 7-6. Cervical cancer cases in ACOS programs by year

Percent of cervical cancer cases that were or are treated in ACOS-approved cancer treatment programs by year among females, RI, 1989-2000.

1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
45	33	35	39	44	41	36	41	32	91	98	97

Source: RICR, HEALTH.

Table 7-7. Cervical cancer cases with AJCC staging by year

Percent of cervical cancer cases staged with AJCC staging methodology by year among females, RI, 1989-2000.

1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
72	77	81	73	84	97	90	93	94	87	92	87

Source: RICR, HEALTH.

Table 7-8. Cervical cancer survival rates by race and stage

Five-year relative invasive cervical cancer survival rates by race and stage of disease at diagnosis among females, US, 1992-1999.

	Localized	Regional	Distant	Unstaged
White	92.6	51.8	17.5	59.0
Black	87.2	41.4	11.6	50.9

* Survival rates are rela tive rates expressed as percents.

Source: *SEER Cancer Statistics Review, 1975-2000*.

Colorectal Cancer

Tables 8-1 and 8-2. Colorectal cancer incidence by year and sex

Average annual invasive colorectal cancer incidence rates** by sex, RI and US, 1987-2001***.*

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Male											
RI	94.1	91.0	85.8	84.4	80.9	78.3	77.8	77.5	75.7	75.9	76.4
US	75.0	73.6	72.2	70.4	68.2	66.6	66.1	65.6	65.1	65.4*	NA
Female											
RI	58.9	57.6	59.0	57.9	54.8	54.5	56.5	55.3	56.6	56.2	55.4
US	51.7	51.0	50.3	49.4	48.5	47.8	47.6	47.7	47.6	47.4*	NA

* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1996-2000).
Source: RICR, HEALTH – calculated with *SEER*Stat*; SEER Cancer Statistics Review, 1973-1999;
1998 US data is from SEER Public-Use 1973-2000 Data – calculated with *SEER*Stat*.

Tables 8-3 and 8-4. Colorectal cancer mortality by year and sex

Average annual colorectal cancer mortality rates by sex, RI and US, 1987-2000***.*

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Male										
RI	37.0	36.9	34.5	34.1	32.7	33.1	31.4	31.9	30.2	28.9
US	30.3	29.9	29.4	29.0	28.4	27.9	27.3	26.7	26.1	25.8*
Female										
RI	22.7	22.7	22.2	21.0	20.7	20.6	20.2	19.5	20.2	20.1
US	20.9	20.5	20.3	20.0	19.7	19.4	19.1	18.8	18.5	18.0*

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1996-2000).
Source: CDC WONDER, CDC;
1998 US data is from SEER US Mortality 1969-2000 Data – calculated with *SEER*Stat*.

Table 8-5. Colorectal cancer incidence by race and sex

Average annual invasive colorectal cancer incidence rates by race and sex, RI and US, 1987-2000.*

	---------- Male ----------		---------- Female ---------	
	White	Black	White	Black
RI	90.9	73.9	61.3	60.7
US	73.8	79.1	51.5	59.9

* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Table 8-6. Colorectal cancer mortality by race and sex

Average annual colorectal cancer mortality rates by race and sex, RI and US, 1987-2000.*

	---------- Male ----------		---------- Female ---------	
	White	Black	White	Black
RI	34.0	26.9	21.8	29.0
US	27.8	35.4	19.0	25.4

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.

Source: RICR, HEALTH; SEER US Mortality 1969-2000 data; calculated with *SEER*Stat*.

Tables 8-9 and 8-10. Colorectal cancer screening by year and sex

Percent of respondents 40 and older who have ever been screened for colorectal cancer (proctoscopic exam, sigmoidoscopy, or colonoscopy), by sex, RI and US, 1995-1999.

	1995	1996	1997	1998	1999
Male					
RI	32.0	NA	38.2	NA	37.4
US	32.1	NA	34.6	NA	33.9
Female					
RI	25.6	NA	31.6	NA	37.2
US	27.1	NA	30.4	NA	32.6

Source: RI-BRFSS, HEALTH; BRFSS, CDC.

Table 8-11. Colorectal cancer cases in ACOS programs by year and sex

Percent of colorectal cancer cases that were or are treated in ACOS-approved cancer treatment programs by year and sex, RI, 1989-2000.

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Male	49	49	51	69	73	70	72	75	71	75	67	82
Female	53	47	50	69	69	67	70	71	70	72	70	83

Source: RICR, HEALTH.

Table 8-12. Colorectal cancer cases with AJCC staging by year and sex

Percent of colorectal cancer cases staged with AJCC staging methodology by year and sex, RI, 1989-2000.

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Male	65	64	68	68	89	92	92	92	91	95	90	92
Female	65	59	62	68	87	90	96	90	90	90	92	90

Source: RICR, HEALTH.

Table 8-13. Male colorectal cancer survival rates by race and stage

Five-year relative invasive colorectal cancer survival rates by stage of disease at diagnosis among males, US, 1992-1999.

	Localized	Regional	Distant	Unstaged
White	91.1	65.7	9.0	39.7
Black	83.0	59.1	7.3	42.8

* Survival rates are relative rates expressed as percents.

Source: *SEER Cancer Statistics Review, 1975-2000*.

Table 8-14. Female colorectal cancer survival rates by race and stage

Five-year relative invasive colorectal cancer survival rates by race and stage of disease at diagnosis among females, US, 1992-1999.

	Localized	Regional	Distant	Unstaged
White	90.0	66.9	9.6	31.6
Black	83.8	58.1	9.0	28.6

* Survival rates are relative rates expressed as percents.
Source: *SEER Cancer Statistics Review, 1975-2000*.

Lung Cancer

Tables 9-1 and 9-2. Lung cancer incidence by year and sex

Average annual invasive lung cancer incidence rates** by sex, RI and US, 1987-2001***.*

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Male											
RI	105.1	106.2	107.3	106.4	106.6	110.7	109.2	107.6	106.8	104.6	102.3
US	98.7	97.9	96.9	95.4	93.8	91.8	89.4	88.0	86.0	85.0*	NA
Female											
RI	46.3	49.6	50.2	52.4	54.4	57.0	57.9	60.6	61.9	62.5	61.3
US	46.8	48.0	48.5	49.4	49.9	50.3	50.8	51.4	51.4	51.6*	NA

* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1996-2000).
Source: RICR, HEALTH – calculated with *SEER*Stat*; SEER Cancer Statistics Review, 1973-1999;
1998 US data is from SEER Public-Use 1973-2000 Data – calculated with *SEER*Stat*.

Tables 9-3 and 9-4. Lung cancer mortality by year and sex

Average annual lung cancer mortality rates by sex, RI and US, 1987-2000***

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Male										
RI	91.9	92.0	92.7	91.6	92.3	91.5	91.3	90.7	89.5	85.9
US	90.2	89.8	89.4	88.7	87.4	85.9	84.6	83.0	81.2	79.5*
Female										
RI	35.5	37.0	38.3	38.9	40.7	43.3	44.9	44.9	46.2	45.0
US	35.6	36.8	37.9	38.7	39.4	40.0	40.5	40.9	41.1	40.7*

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1996-2000).
Source: CDC WONDER, CDC;
1998 US data is from SEER US Mortality 1969-2000 Data – calculated with *SEER*Stat*.

Table 9-5. Lung cancer incidence by race and sex

Average annual invasive lung cancer incidence rates by race and sex, RI and US, 1987-2000.*

	---------- Male ----------		---------- Female ---------	
	White	Black	White	Black
RI	108.1	127.1	56.1	59.2
US	90.6	134.2	51.0	53.3

* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.

Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Table 9-6. Lung cancer mortality by race and sex

Average annual lung cancer mortality rates by race and sex, RI and US, 1987-2000.*

	---------- Male ----------		---------- Female ---------	
	White	Black	White	Black
RI	90.3	117.7	41.5	52.5
US	83.2	115.8	39.2	37.9

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.

Source: RICR, HEALTH; SEER US Mortality 1969-2000 data; calculated with *SEER*Stat*.

Tables 9-9 and 9-10. Current smokers by year and sex

Percent of respondents 18 and older who have ever smoked 100 cigarettes in their lifetime and reported smoking every day or some days, by year and sex, RI and US, 1990-2001.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Male												
RI	27.3	24.9	24.2	25.9	NA	24.0	25.6	25.5	24.0	23.1	23.8	25.8
US	24.9	25.1	24.2	24.0	23.9	24.8	25.5	25.4	25.3	24.2	24.4	25.4
Female												
RI	24.0	25.1	20.4	21.1	NA	25.4	19.7	23.2	21.3	21.5	23.0	22.1
US	21.3	21.3	21.0	21.1	21.6	20.9	21.9	21.1	20.9	20.8	21.2	21.2

Source: RI-BRFSS, HEALTH; BRFSS, CDC.

Table 9-11. Lung cancer cases in ACOS programs by year and sex

Percent of lung cancer cases that were or are treated in ACOS-approved cancer treatment programs by year and sex, RI, 1989-2000.

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Male	64	64	60	75	78	77	80	76	77	77	80	88
Female	53	58	56	79	78	78	77	80	78	79	82	91

Source: RICR, HEALTH.

Table 9-12. Lung cancer cases with AJCC staging by year and sex

Percent of lung cancer cases staged with AJCC staging methodology by year and sex, RI, 1989-2000.

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Male	71	72	69	71	77	81	87	81	82	88	87	93
Female	65	68	72	77	76	76	81	82	82	85	88	91

Source: RICR, HEALTH.

Table 9-13. Male lung cancer survival rates by race and stage

Invasive lung cancer five-year relative survival rates by stage of disease at diagnosis among males, US, 1992-1999.

	Localized	Regional	Distant	Unstaged
White	45.0	15.2	1.8	7.3
Black	40.0	12.7	1.6	9.7

* Survival rates are relative rates expressed as percents.
Source: *SEER Cancer Statistics Review, 1975-2000*.

Table 9-14. Female lung cancer survival rates by race and stage

Five-year relative invasive lung cancer survival rates by race and stage of disease at diagnosis among females, US, 1992-1999.

	Localized	Regional	Distant	Unstaged
White	53.6	17.7	2.2	9.4
Black	47.7	15.0	2.4	8.7

* Survival rates are relative rates expressed as percents.
Source: *SEER Cancer Statistics Review, 1975-2000*.

Melanoma of Skin

Tables 10-1 and 10-2. Melanoma of skin incidence by year and sex

Average annual invasive melanoma of skinincidence rates** by year and sex, RI and US, 1987-2001***.*

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Male											
RI	15.4	16.3	17.4	17.2	18.5	19.9	19.6	20.5	22.4	22.7	23.8
US	21.9	23.0	24.1	25.4	26.8	28.4	29.8	31.7	33.1	34.5	NA
Female											
RI	8.9	10.4	10.4	11.4	12.6	12.9	12.7	12.9	12.9	13.1	13.8
US	15.7	16.1	16.5	17.1	17.9	18.7	19.7	20.9	21.9	22.6	NA

* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1996-2000).
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Tables 10-3 and 10-4. Melanoma of skin mortality by year and sex

Average annual melanoma of skin mortality rates by year and sex, RI and US, 1987-2000**.*

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Male										
RI	4.0	4.0	4.0	3.6	3.6	3.4	3.4	3.3	3.6	3.3
US	3.8	3.8	3.8	3.8	3.9	3.9	3.9	4.0	4.0	3.9
Female										
RI	1.5	1.7	1.9	1.7	1.6	1.7	2.0	2.0	2.2	2.5
US	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1996-2000).
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

Table 10-5. Melanoma of skin incidence by race and sex

Average annual invasive melanoma of skin incidence rates by race and sex, RI and US, 1987-2000.*

	---------- Male ----------		---------- Female ---------	
	White	Black	White	Black
RI	25.7	0.3	16.6	0.5
US	32.6	1.8	22.2	1.3

* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Table 10-6. Melanoma of skin mortality by race and sex

Average annual melanoma of skin mortality rates by race and sex, RI and US, 1987-2000.*

	---------- Male ----------		---------- Female ---------	
	White	Black	White	Black
RI	3.8	1.5	2.0	1.0
US	4.3	0.5	2.1	0.5

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: RICR, HEALTH; SEER US Mortality 1969-2000 data; calculated with *SEER*Stat*.

Table 10-7. Melanoma of skin cases in ACOS programs by year and sex

Percent of melanoma of skin cases that were or are treated in ACOS-approved cancer treatment programs by year and sex, RI, 1989-2000.

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Male	57	67	56	87	86	87	82	85	84	84	86	93
Female	55	71	72	85	78	82	79	88	84	86	88	92

Source: RICR, HEALTH.

Table 10-8. Melanoma of skin cases with AJCC staging by year and sex

Percent of melanoma of skin cases staged with AJCC staging methodology by year and sex, RI, 1989-2000.

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Male	53	48	50	56	66	67	64	68	43	28	37	42
Female	60	49	50	56	58	55	55	38	40	29	33	35

Source: RICR, HEALTH.

Table 10-9. Male melanoma of skin survival rates by race and stage

Five-year relative invasive melanoma of skin survival rates by race and stage of disease at diagnosis among males, US, 1992-1999.*

	Localized	Regional	Distant	Unstaged
White	96.5	56.0	12.4	76.2
Black	85.8**	NA	NA	NA

* Survival rates are relative rates expressed as percents.
** The standard error of the survival rate is greater than 10 percentage points.
NA Statistic could not be calculated
Source: *SEER Cancer Statistics Review, 1975-2000*.

Table 10-10. Female melanoma of skin survival rates by race and stage

Five-year relative invasive melanoma of skin survival rates by race and stage of disease at diagnosis among females, US, 1992-1999.*

	Localized	Regional	Distant	Unstaged
White	97.1	67.1	16.4	85.0
Black	84.9**	NA	NA	NA

* Survival rates are relative rates expressed as percents.
** The standard error of the survival rate is between 5 and 10 percentage points.
NA Statistic could not be calculated.
Source: *SEER Cancer Statistics Review, 1975-2000*.

Oropharyngeal Cancer

Tables 11-1 and 11-2. Oropharyngeal cancer incidence by year and sex

Average annual invasive oropharyngeal cancer incidence rates** by sex, RI and US, 1987-2001***.*

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Male											
RI	17.6	16.6	14.9	14.7	14.8	15.0	15.6	16.2	16.8	16.7	15.1
US	20.1	19.7	19.8	19.6	19.2	18.9	18.6	18.1	17.6	17.2	NA
Female											
RI	6.6	7.0	6.8	7.5	7.3	6.7	6.9	6.5	6.5	6.3	6.5
US	7.5	7.4	7.4	7.4	7.4	7.3	7.3	7.2	7.1	6.9	NA

* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1996-2000).
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Tables 11-3 and 11-4. Oropharyngeal cancer mortality by year and sex

Average annual oropharyngeal cancer mortality rates by sex, RI and US, 1987-2000**.*

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Male										
RI	7.0	7.1	6.0	5.4	5.1	4.9	4.3	4.3	4.1	3.5
US	5.5	5.4	5.3	5.2	5.1	4.9	4.8	4.7	4.5	4.4
Female										
RI	1.7	1.6	1.5	1.8	1.9	1.9	1.9	1.9	1.7	1.8
US	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.7	1.7

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1996-2000).
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

Table 11-5. Oropharyngeal cancer incidence by race and sex

Average annual invasive oropharyngeal cancer incidence rates by race and sex, RI and US, 1987-2000.*

	---------- Male ----------		---------- Female ---------	
	White	Black	White	Black
RI	16.5	20.6	6.6	7.7
US	18.4	24.7	7.3	7.0

* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Table 11-6. Oropharyngeal cancer mortality by race and sex

Average annual oropharyngeal cancer mortality rates by race and sex, RI and US, 1987-2000.*

	---------- Male ----------		---------- Female ---------	
	White	Black	White	Black
RI	5.2	7.0	1.8	1.3
US	4.5	9.2	1.8	2.3

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: RICR, HEALTH; SEER US Mortality 1969-2000 data; calculated with *SEER*Stat*.

Tables 11-7 and 11-8. Chronic drinking by year and sex

Percent of respondents 18 and older who report an average of two or more alcoholic drinks per day (Chronic drinking = 14 or more drinks per week for males and 7 or more drinks per week for women) by year and sex, RI and US, 1990-2001.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Male												
RI	9.5	9.4	10.2	8.6	NA	10.0	NA	7.8	NA	7.3	NA	8.6
US	5.8	6.2	5.2	5.5	NA	5.0	NA	5.3	NA	6.4	NA	6.3
Female												
RI	1.5	0.9	1.5	1.5	NA	1.2	NA	1.9	NA	1.6	NA	6.6
US	0.8	0.9	0.8	0.9	NA	0.8	NA	0.8	NA	0.9	NA	3.9

Source: RI-BRFSS, HEALTH; BRFSS, CDC.

Table 11-9. Oropharyngeal cancer cases in ACOS programs by year and sex

Percent of oropharyngeal cancer cases that were or are treated in ACOS-approved cancer treatment programs by year and sex, RI, 1989-2000.

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Male	60.3	62.9	63.4	80.0	81.1	85.1	85.5	83.3	77.5	77.0	79.8	92.2
Female	55.2	55.2	59.4	80.3	75.5	86.4	82.1	76.6	77.1	71.4	82.3	91.1

Source: RICR, HEALTH.

Table 11-10. Oropharyngeal cancer cases with AJCC staging by year and sex

Percent of oropharyngeal cancer cases staged with AJCC staging methodology by year and sex, RI, 1989-2000.

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Male	73	70	76	69	82	89	88	86	89	84	90	92
Female	48	61	73	71	78	83	86	90	78	78	76	85

Source: RICR, HEALTH.

Table 11-11. Male oropharyngeal cancer survival rates by race and stage

Invasive oropharyngeal cancer five-year relative survival rates by race and stage of disease at diagnosis among males, US, 1992-1999.

	Localized	Regional	Distant	Unstaged
White	82.7	50.3	25.7	44.1
Black	62.7	28.0	16.1	19.5

* Survival rates are relative rates expressed as percents.
** The standard error of the survival rate is between 5 and 10 percentage points.
Source: *SEER Cancer Statistics Review, 1975-2000*.

Table 11-12. Female oropharyngeal cancer survival rates by race and stage

Invasive oropharyngeal cancer five-year relative survival rates by race and stage of disease at diagnosis among females, US, 1992-1999.

	Localized	Regional	Distant	Unstaged
White	82.6	48.8	29.0	48.0
Black	77.7	39.1	34.9*	51.0*

* Survival rates are relative rates expressed as percents.
** The standard error of the survival rate is between 5 and 10 percentage points.
Source: *SEER Cancer Statistics Review, 1975-2000*.

Ovarian Cancer

Table 12-1. Ovarian cancer incidence by year

Average annual invasive ovarian cancer incidence rates** among females, RI and US, 1987-2001***.*

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
RI	16.5	16.3	16.3	16.5	17.5	16.6	16.2	16.1	16.3	15.4	14.5
US	17.5	17.8	17.8	17.7	17.6	17.4	17.3	17.1	17.2	16.9	NA

* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1996-2000).
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Table 12-2. Ovarian cancer mortality by year

Average annual ovarian cancer mortality rates among females, RI and US, 1987-2000**.*

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
RI	9.5	9.2	8.8	9.2	8.7	8.3	8.3	9.0	8.8	8.8
US	9.3	9.4	9.3	9.4	9.3	9.2	9.1	9.0	8.9	8.8

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1996-2000).
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

Table 12-3. Ovarian cancer incidence by race

Average annual invasive ovarian cancer incidence rates by race among females, RI and US, 1987-2000.*

	White	Black
RI	16.4	7.8
US	18.3	12.4

* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Table 12-4. Ovarian cancer mortality by race

Average annual ovarian cancer mortality rates by race among females, RI and US, 1987-2000.*

	White	Black
RI	9.1	8.4
US	9.4	7.7

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: RICR, HEALTH; SEER US Mortality 1969-2000 data; calculated with *SEER*Stat*.

Table 12-5. Ovarian cancer cases in ACOS programs by year

Percent of ovarian cancer cases that were or are treated in ACOS-approved cancer treatment programs by year among females, RI, 1989-2000.

1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
48	42	41	51	50	50	46	45	44	79	82	93

Source: RICR, HEALTH.

Table 12-6. Ovarian cancer cases with AJCC staging by year

Percent of ovarian cancer cases staged with AJCC staging methodology by year among females, RI, 1989-2000.

1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
73	68	77	82	87	83	83	86	90	92	77	67

Source: RICR, HEALTH.

Table 12-7. Ovarian cancer survival rates by race and stage

Five-year relative invasive ovarian cancer survival rates by race and stage of disease at diagnosis among females, US, 1992-1999.

	Localized	Regional	Distant	Unstaged
White	94.8	71.3	30.8	26.4
Black	92.5	72.0*	26.3	38.4*

* Survival rates are relative rates expressed as percents.
** The standard error of the survival rate is between 5 and 10 percentage points.
Source: *SEER Cancer Statistics Review, 1975-2000*.

Prostate Cancer

Table 13-1. Prostate cancer incidence by year

Average annual invasive prostate cancer incidence rates** among males, RI and US, 1987-2001***.*

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
RI	117.8	133.3	152.2	165.8	173.0	172.6	171.7	165.3	168.0	172.2	177.1
US	160.1	180.5	194.6	201.3	200.7	191.1	177.9	169.6	168.8	172.8*	NA

* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1996-2000).
Source: RICR, HEALTH – calculated with *SEER*Stat*; SEER Cancer Statistics Review, 1973-1999;
1998 US data is from SEER Public-Use 1973-2000 Data – calculated with *SEER*Stat*.

Table 13-2. Prostate cancer mortality by year

Average annual prostate cancer mortality rates among males, RI and US, 1987-2000**.*

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
RI	35.8	35.3	35.3	34.8	35.9	35.1	35.4	35.6	33.8	33.1
US	36.8	37.6	38.4	38.7	38.5	37.8	36.8	35.3	33.9	32.9*

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1996-2000).
Source: CDC WONDER, CDC;
1998 US data is from SEER US Mortality 1969-2000 Data – calculated with *SEER*Stat*.

Table 13-3. Prostate cancer incidence by race

Average annual invasive prostate cancer incidence rates by race among males, RI and US, 1987-2000.*

	White	Black
RI	155.9	206.0
US	172.3	267.6

* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

Table 13-4. Prostate cancer mortality by race

Average annual prostate cancer mortality rates by race among males, RI and US, 1987-2000.*

	White	Black
RI	34.3	77.9
US	33.2	75.2

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: RICR, HEALTH; SEER US Mortality 1969-2000 data; calculated with *SEER*Stat*.

Table 13-6. Prostate cancer cases in ACOS programs by year

Percent of prostate cancer cases that were or are treated in ACOS-approved cancer treatment programs by year among males, RI, 1989-2000.

1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
64	56	57	78	79	78	79	80	78	78	74	88

Source: RICR, HEALTH.

Table 13-7. Prostate cancer cases with AJCC staging by year

Percent of prostate cancer cases staged with AJCC staging methodology by year among males, RI, 1989-2000.

1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
51	53	52	54	66	63	73	71	69	71	73	73

Source: RICR, HEALTH.

Table 13-8. Prostate cancer survival rates by race and stage

Five-year relative invasive prostate cancer survival rates by race and stage at diagnosis among males, US, 1992-1999.*

	Local/Regional	Distant	Unstaged
White	100.0	33.3	89.0
Black	100.0	30.4	85.5

* Survival rates are relative rates expressed as percents.
Source: *SEER Cancer Statistics Review, 1975-2000*.

Special Studies: Cancer Rates Among Rhode Island Hispanics

Table 14-1. Hispanic male cancer cases by data source and year

Annual number of newly diagnosed cancers by data source and year among resident Hispanic males, RI 1989-1998.

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Either Source	41	41	44	56	39	40	54	55	61	76
Surname Analysis	30	35	36	51	34	31	46	40	46	51
Cancer Registry	21	16	20	10	14	17	18	28	36	44

* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; surname analysis technique from Word.

Table 14-2. Hispanic and all resident cancer rates by year and sex

Average annual cancer rates for all cancers combined by year and sex among Hispanics and all residents, RI, 1989-1998.*

Type of Rate	Sex	Time Period	Hispanics	All Residents
			--- *Age-Adjusted Rate* ---	
Incidence	Male	1994-1998	506.5	589.5
Incidence	Male	1989-1993	535.5	634.0
Mortality	Female	1994-1998	143.3	184.4
Mortality	Female	1989-1993	125.6	181.1
Mortality	Male	1994-1998	240.3	295.4
Mortality	Male	1989-1993	180.8	282.3

* Rates are age-adjusted to the year 2000 US standard population, expressed as cases/deaths per 100,000 population.
Source: RICR, HEALTH; Office of Vital Records, HEALTH; surname analysis technique from Word.

Table 14-3. Hispanic and all resident male cancer cases by site

Average annual percentage of all newly diagnosed cancers by anatomic site among Hispanic males and all resident males, RI, 1994-1998.

Anatomic Site	Hispanic Males	All Resident Males
	-- *Percentage of Newly Diagnosed Cancers* --	
Prostate	24.8	26.9
Lung & Bronchus	12.6	17.3
Colon & Rectum	9.7	12.1
Leukemias	7.3	2.7
Stomach	7.0	2.4
Lymphomas	5.6	4.7
Urinary Bladder	2.1	7.9
Liver	4.2	0.9
Pancreas	1.7	2.2
Brain	2.8	1.4

Source: RICR, HEALTH; surname analysis technique from Word.

Special Studies: Cancer Mortality in Rhode Island, an Old Urban State

Table 14-4. Cancer mortality for all cancer combined by sex and decade

Cancer mortality rates for all cancers combined by sex and decade, RI and US, 1970-1999.*

	1970-1979	1980-1989	1990-1999
RI Male	236.6	234.6	220.8
US Male	204.3	212.0	204.0
RI Female	144.0	145.4	147.4
US Female	131.1	137.0	138.0

* Rates are age-adjusted to the year 1970 US standard population, expressed as deaths per 100,000 population.
Source: SEER US Mortality 1969-2000 Data; SEER web query system.

Table 14-5. Percent elevation in white male cancer mortality by cancer site group and decade

Percent elevation in cancer mortality rates by cancer site group and decade among white males, RI relative to the US, 1970-1999.*

	All	Tobacco Related	Diet Related	All Other
1970-1979	16	18	28	3
1980-1989	11	10	22	2
1990-1999	8	10	14	2

* Rates are age-adjusted to the year 1970 US standard population, expressed as deaths per 100,000 population.
Source: SEER US Mortality 1969-2000 Data; SEER web query system.

Table 14-6. Percent elevation in white female cancer mortality by cancer site group and decade

Percent elevation in cancer mortality rates by cancer site group and decade among white females, RI relative to the US, 1970-1999.*

	All	Tobacco Related	Diet Related	All Other
1970-1979	10	1	25	0
1980-1989	6	3	16	0
1990-1999	7	6	13	2

* Rates are age-adjusted to the year 1970 US standard population, expressed as deaths per 100,000 population.
Source: SEER US Mortality 1969-2000 Data; SEER web query system.

Special Studies: Cancer Incidence in Rhode Island Cities and Towns

Table 14-7. Statewide and municipal cancer incidence rates by site and sex

Average annual statewide and municipal cancer incidence rates by anatomical site and sex, RI, 1987-2000.*

	---------- Males ----------				---------- Females ----------			
Municipality	Colon	Lung	Prostate	All**	Colon	Lung	Breast	All**
Rhode Island	82.6	105.8	153.0	601.4	56.4	54.3	130.6	435.7
Barrington	81.1	87.9	173.3	581.4	49.8	42.1	146.4	436.5
Bristol	79.3	101.0	143.5	576.6	49.2	36.5	129.7	375.7
Burrillville	89.9	110.9	146.1	556.4	61.2	42.8	113.6	383.8
Central Falls	83.3	147.5	117.4	621.4	55.0	59.0	101.7	398.4
Charlestown	51.9	82.8	224.7	629.9	46.8	75.5	138.9	472.3
Coventry	85.2	124.3	149.7	607.0	61.6	52.9	134.3	445.5
Cranston	86.1	100.6	142.1	592.1	56.5	52.3	135.1	431.0
Cumberland	76.9	81.9	161.1	545.6	66.0	42.5	135.2	429.2
East Greenwich	90.6	105.8	240.4	726.1	68.7	42.3	175.2	508.5
East Providence	82.8	109.1	146.5	591.7	62.1	49.8	127.1	438.6
Exeter	51.0	98.0	125.3	449.0	52.1	51.5	120.7	427.8
Foster	57.2	86.6	175.0	590.6	40.8	71.0	163.5	454.3
Glocester	43.2	73.6	129.1	449.3	44.1	52.6	96.8	354.8
Hopkinton	102.5	100.7	176.9	669.3	61.5	62.6	151.3	512.4
Jamestown	45.8	80.2	196.3	623.6	58.9	66.0	152.4	476.3
Johnston	85.4	113.6	140.0	604.2	58.5	56.0	147.1	468.6
Lincoln	79.2	90.1	150.1	567.5	49.2	36.3	114.9	365.0
Little Compton	65.2	108.1	169.5	587.2	29.2	39.7	141.1	422.0
Middletown	70.6	111.7	236.1	693.8	58.3	70.2	146.4	472.2
Narragansett	77.1	84.9	198.2	579.0	68.7	54.6	130.6	457.6
New Shoreham	20.8	81.9	188.3	636.6	0.0	60.4	174.3	394.0
Newport	76.4	107.3	247.6	716.6	58.3	72.4	139.9	480.9
North Kingstown	96.4	102.2	207.8	706.0	50.9	61.9	139.1	470.7
North Providence	89.4	103.0	124.9	594.2	51.1	56.1	131.8	425.0
North Smithfield	72.7	77.5	118.4	523.7	64.6	45.0	115.8	431.0
Pawtucket	94.5	113.1	130.8	605.0	55.7	52.7	123.2	428.1
Portsmouth	87.4	97.1	202.3	598.5	63.1	62.4	153.1	468.0
Providence	72.2	111.6	136.7	588.7	53.2	56.7	123.2	435.5
Richmond	89.6	102.0	178.5	671.3	47.9	64.4	75.2	331.8
Scituate	66.2	125.2	176.7	602.1	51.6	42.1	167.3	438.1
Smithfield	74.2	93.9	151.8	581.3	54.4	59.5	130.0	435.3
South Kingstown	67.9	99.5	187.0	608.0	56.0	57.0	149.4	447.6
Tiverton	76.1	84.0	149.4	531.3	49.2	46.3	104.1	377.2
Warren	82.1	98.7	137.5	575.7	53.4	59.1	130.6	427.0
Warwick	89.8	114.1	156.8	637.9	57.8	65.1	133.7	460.8
West Greenwich	91.2	137.3	182.0	637.6	46.6	93.6	109.5	475.5
West Warwick	103.8	125.3	144.1	649.9	57.1	59.7	123.3	440.5
Westerly	78.5	89.7	174.0	625.1	61.1	46.8	127.3	433.7
Woonsocket	102.6	121.0	125.5	608.7	59.1	53.0	119.2	425.0

* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.

** All cancers combined

Source: RICR, HEALTH.

Table 14-8. Statewide cancer incidence rates and standard deviations of municipal rates by site and sex

Average annual statewide cancer incidence rates and standard deviations of municipal rates by anatomical site and sex, RI, 1987-2000.*

	---------- Males ----------			---------- Females ----------		
Site	Statewide Rate*	Standard Deviation	SD as # of State Rate	Statewide Rate	Standard Deviation	SD as # of State Rate
Colon	82.6	17.5	21.1%	56.4	11.8	20.8%
Lung	105.8	16.7	15.8%	54.3	11.8	21.8%
Prostate	153.0	34.6	22.6%	--	--	--
Breast	--	--	--	130.6	20.8	15.9%
All**	601.4	59.2	9.8%	435.7	39.8	9.1%

* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
** All cancers combined
Source: RICR, HEALTH.

Table 14-9. Statewide and municipal cancer cases by site and sex

Average annual statewide and municipal cases of diagnosed cancer by anatomical site and sex, RI, 1987-2000.

	Males				Females			
Municipality	Colon	Lung	Prostate	All*	Colon	Lung	Breast	All*
Rhode Island	5132	6820	9849	38346	5420	4793	10881	37981
Barrington	88	95	185	623	68	59	196	587
Bristol	122	167	244	936	108	74	231	720
Burrillville	75	94	120	473	80	49	128	454
Central Falls	76	137	106	576	93	84	144	579
Charlestown	24	41	110	305	26	44	75	256
Coventry	151	232	274	1121	163	136	336	1132
Cranston	472	561	814	3291	491	396	979	3280
Cumberland	149	171	322	1086	191	121	353	1157
East Greenwich	67	76	173	535	71	42	177	517
East Providence	296	404	543	2125	376	266	626	2302
Exeter	13	28	33	131	18	18	41	148
Foster	13	19	42	141	12	18	48	129
Glocester	20	41	56	217	23	29	61	208
Hopkinton	37	42	66	262	31	31	75	255
Jamestown	14	30	73	216	26	29	66	205
Johnston	166	229	285	1195	176	149	372	1248
Lincoln	109	131	218	803	102	72	198	672
Little Compton	18	28	48	159	10	14	43	132
Middletown	68	113	236	702	96	101	201	680
Narragansett	66	75	174	517	73	62	139	496
New Shoreham	2	6	14	45	0	6	13	31
Newport	111	158	361	1064	141	161	285	1043
North Kingstown	127	143	281	972	96	116	260	882
North Providence	220	259	317	1458	196	195	429	1440
North Smithfield	56	60	93	406	79	46	114	453
Pawtucket	427	518	607	2760	406	353	761	2777
Portsmouth	83	105	200	611	81	83	199	609
Providence	585	911	1127	4860	717	668	1394	5238
Richmond	23	30	47	177	14	17	27	107
Scituate	42	78	111	382	37	31	122	318
Smithfield	87	112	178	687	105	99	203	728
South Kingstown	90	135	252	820	105	97	253	781
Tiverton	82	89	158	563	64	61	133	481
Warren	66	82	116	474	68	67	138	477
Warwick	515	698	949	3788	518	549	1058	3775
West Greenwich	16	25	32	123	8	19	31	112
West Warwick	170	233	258	1144	145	144	281	1053
Westerly	120	139	281	976	141	96	239	876
Woonsocket	266	325	345	1622	265	191	452	1643

* All cancers combined

Source: RICR, HEALTH.

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Table 14-10. Statewide and municipal cancer mortality rates with standard errors and 95% confidence limits by sex

Average annual statewide and municipal cancer mortality rates with standard errors and 95% confidence limit by sex, RI, 1987-2000.*

	---------- Males ----------					---------- Females ----------				
Municipality	Mx Rt	Std Err	Low CL	Hi CL	Sig .05	Mx Rt	Std Err	Low CL	Hi CL	Sig .05
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
*[United States]**	*268.0*	*0.1*	*267.7*	*268.3*	*(NA)*	*171.7*	*0.1*	*171.5*	*171.9*	*(NA)*
*[New England]**	*273.2*	*0.6*	*272.0*	*274.4*	*(NA)*	*179.5*	*0.4*	*178.8*	*180.3*	*(NA)*
Rhode Island	*284.3*	*4.3*	*275.9*	*292.7*	*(NA)*	*181.4*	*2.8*	*175.9*	*186.9*	*(NA)*
Barrington	284.1	34.8	215.9	352.3		172.4	22.2	128.9	215.9	
Bristol	264.2	26.0	213.2	315.2		**138.2**	**16.3**	**106.3**	**170.1**	**Low**
Burrillville	285.4	36.5	213.9	356.9		153.7	22.6	109.4	198.0	
Central Falls	335.1	37.8	261.0	409.2		171.3	21.4	129.4	213.2	
Charlestown	239.6	46.4	148.7	330.5		192.0	36.9	119.7	264.3	
Coventry	290.3	26.6	238.2	342.4		180.3	16.4	148.2	212.4	
Cranston	278.1	14.3	250.1	306.1		177.5	9.4	159.1	195.9	
Cumberland	256.4	24.3	208.8	304.0		166.5	15.2	136.7	196.3	
East Greenwich	**197.3**	**33.5**	**131.6**	**263.0**	**Low**	**136.6**	**22.8**	**91.9**	**181.3**	**Low**
East Providence	291.4	17.9	256.3	326.5		188.8	11.8	165.7	211.9	
Exeter	289.6	67.6	157.1	422.1		199.0	48.3	104.3	293.7	
Foster	208.7	64.4	82.5	334.9		181.0	51.0	81.0	281.0	
Glocester	235.4	48.2	140.9	329.9		208.1	38.1	133.4	282.8	
Hopkinton	296.8	56.5	186.1	407.5		186.8	39.5	109.4	264.2	
Jamestown	270.7	62.4	148.4	393.0		224.2	44.9	136.2	312.2	
Johnston	288.9	24.3	241.3	336.5		176.9	15.9	145.7	208.1	
Lincoln	267.1	27.6	213.0	321.2		149.2	17.3	115.3	183.1	
Little Compton	288.5	68.1	155.0	422.0		161.8	44.9	73.8	249.8	
Middletown	278.8	33.2	213.7	343.9		195.3	22.9	150.4	240.2	
Narragansett	267.7	37.1	195.0	340.4		193.5	26.2	142.1	244.9	
New Shoreham	382.0	183.2	22.9	741.1		246.5	107.7	35.4	457.6	
Newport	290.1	28.0	235.2	345.0		195.0	18.5	158.7	231.3	
North Kingstown	308.7	31.6	246.8	370.6		183.8	19.3	146.0	221.6	
North Providence	293.2	22.2	249.7	336.7		182.8	14.4	154.6	211.0	
North Smithfield	244.2	34.9	175.8	312.6		174.9	25.1	125.7	224.1	
Pawtucket	297.7	16.3	265.8	329.6		183.2	10.4	162.8	203.6	
Portsmouth	253.3	35.0	184.7	321.9		163.5	21.9	120.6	206.4	
Providence	299.7	12.0	276.2	323.2		192.3	7.8	177.0	207.6	
Richmond	328.1	87.4	156.8	499.4		225.2	59.4	108.8	341.6	
Scituate	258.8	43.3	173.9	343.7		174.4	30.5	114.6	234.2	
Smithfield	256.9	29.1	199.9	313.9		189.5	21.0	148.3	230.7	
South Kingstown	255.7	28.2	200.4	311.0		153.9	18.1	118.4	189.4	
Tiverton	284.6	34.9	216.2	353.0		160.6	21.6	118.3	202.9	
Warren	253.1	34.6	185.3	320.9		188.8	25.5	138.8	238.8	
Warwick	301.3	14.5	272.9	329.7		**202.8**	**9.7**	**183.8**	**221.8**	**High**
West Greenwich	282.8	100.4	86.0	479.6		220.1	68.5	85.8	354.4	
West Warwick	306.3	28.0	251.4	361.2		190.3	17.4	156.2	224.4	
Westerly	249.2	25.5	199.2	299.2		180.9	18.4	144.8	217.0	
Woonsocket	**338.2**	**22.6**	**293.9**	**382.5**	**High**	178.7	13.5	152.2	205.2	

(1) Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
(2) Standard error of proportion for the age-adjusted rate
(3) 1.96 S.E. lower confidence limit
(4) 1.96 S.E. higher confidence limit
(5) Indication of significant difference from the Rhode Island state rate, P < 0.05
(NA) Not Applicable

* Rates for US and New England from SEER US Mortality 1969-2000 Data, calculated with *SEER*Stat*[+]

Source: Office of Vital Records, HEALTH.

APPENDIX:
RHODE ISLAND CANCER RATES, 1997-2001 - DETAILED TABLES

Introduction

The Rhode Island Cancer Registry maintains up-to-date cancer statistics for the State, including incidence rates, prevalence estimates, and mortality rates. The statistics are computed for the State as a whole and for counties. The latest incidence statistics are available for the years 1997-2001, prepared in July, 2003. The latest mortality statistics are available for the years 1996-2000.

Sources of Data

Incidence

Age-adjusted incidence rates by sex and by race are computed from:

- case reports of newly diagnosed cancers made to the Rhode Island Cancer Registry
- counts of the Rhode Island population in the censuses of 1980, 1990, and 2000

Prevalence

Age-adjusted prevalence estimates by sex and by race are computed from:

- prevalence estimates prepared by the National Cancer Institute
- counts of the Rhode Island population in the census of 2000

Mortality

Age-adjusted mortality rates by sex and by race are computed from:

- death records from the Office of Vital Records, Rhode Island Department of Health
- counts of the Rhode Island population in the censuses of 1980, 1990, and 2000

Methods

Incidence and mortality rates and corresponding standard errors are calculated using SEERStat, software produced for public use by the Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute. The algorithms for rates, as described in SEERStat documentation, are as follows:

Crude Rate

A crude rate is the number of cases per 100,000 in a given population.

$$cruderate = \frac{count}{population} \times 100{,}000$$

Age-adjusted Rate

An age-adjusted rate is a weighted average of crude rates, where the crude rates are calculated for different age groups and the weights are the proportions of persons in the corresponding age groups of a standard population. Several sets of standard populations are included in SEER*Stat. These include the total U.S. populations (1940, 1950, 1960, 1970, 1980, and 1990), an estimate of the U.S. 2000 population, 1991 Canadian population, and the world population. The age-adjusted rate for an age group comprised of the ages x through y is calculated using the following formula:

$$aarate_{x-y} = \sum_{i=x}^{y}\left[\left(\frac{count_i}{pop_i}\right)\times 100{,}000\times\left(\frac{stdmil_i}{\sum_{j=x}^{y} stdmil_j}\right)\right]$$

where count is the number of cases for the ith age group, pop_i is the relevant population for the same age group, and $stdmil_i$ is the standard population for the same age group.

Standard Error for a Crude Rate

This calculation assumes that the cancer counts have Poisson distributions.

$$SE_{crude} = \frac{\sqrt{count}}{population}\times 100{,}000$$

Standard Error for an Age-adjusted Rate

This calculation assumes that the cancer counts have Poisson distributions. Suppose that the age-adjusted rate is comprised of age groups x through y.

$$SE_{AArate} = \left[\sum_{i=x}^{y}\left(\frac{stdmil_i}{\sum_{j=x}^{y} stdmil_j}\right)^2\times\left(\frac{count_i}{population_i^2}\right)\right]^{1/2}\times 100{,}000$$

Crude Rate Confidence Intervals

The endpoints of a p x 100% confidence interval are calculated as:

$$CI_{low} = \frac{\left(\frac{1}{2}\left(ChiInv\left(\frac{p}{2}, 2\times count\right)\right)\right)}{population}\times 100{,}000$$

$$CI_{high} = \frac{\left(\frac{1}{2}\left(ChiInv\left(1-\frac{p}{2}, 2\times(count+1)\right)\right)\right)}{population}\times 100{,}000$$

where Chi Inv(p,n) is the inverse of the chi-squared distribution function evaluated at p and with n degrees of freedom, and we define Chi Inv (p,0) = 0.

Although the normal approximation may be used with the standard errors to obtain confidence intervals when the count is large, we use the above exact method that holds even with small counts (see Johnson and Kotz, 1969, or Fay and Feuer, 1997). When the count is large the 2 methods produce similar results.

Age-adjusted Rate Confidence Intervals

Suppose that the age-adjusted rate is comprised of age groups x through y, and let:

$$w_i = \frac{stdmil_i}{\left(pop_i \times \sum_{j=x}^{y} stdmil_j\right)}$$

$$w_m = \max\left(w_i\right)$$

$$v = \sum_{i=x}^{y}\left(w_i^2 \times count_i\right)$$

The endpoints of a p x 100% confidence interval are calculated as:

$$CI_{low} = \left(\frac{v}{2 \times rate}\right) \times \left(ChiInv\left(\frac{p}{2}, \frac{\left(2 \times rate^2\right)}{v}\right)\right) \times 100{,}000$$

$$CI_{high} = \left(\frac{v + w_m^2}{2\left(rate + w_m\right)}\right) \times \left(ChiInv\left(1 - \frac{p}{2}, \frac{2\left(rate + w_m\right)^2}{\left(v + w_m^2\right)}\right)\right) \times 100{,}000$$

This method for calculating the confidence interval was developed in Fay and Feuer (1997). The method produces similar confidence limits to the standard normal approximation when the counts are large and the population being studied is similar to the standard population. In other cases, the above method is more likely to ensure proper coverage.

Note

"Rate" used in the above formulas is not per 100,000 population.

Source

SEERStat Version 4.2, April, 2002.

List of Tables

Table 1 Total Cancer Cases and Average Annual Age-adjusted Cancer Incidence Rates (U.S. Year 2000 Standard) Rhode Island, 1997-2001, All Races, by Sex and Anatomical Site

	Males (All Races)			Females (All Races)		
SITES	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Sites	15,093	633.1	5.2	14,530	452.6	3.8
Oral Cavity and Pharynx	365	15.1	0.8	205	6.5	0.5
Lip	27	1.2	0.2	19	0.6	0.1
Tongue	103	4.2	0.4	56	1.8	0.2
Salivary Gland	33	1.4	0.2	36	1.1	0.2
Floor of Mouth	28	1.2	0.2	14	0.4	0.1
Gum and Other Mouth	46	1.9	0.3	38	1.2	0.2
Nasopharynx	22	0.9	0.2	4	0.1	0.1
Oropharynx	30	1.2	0.2	11	0.4	0.1
Hypopharynx	39	1.6	0.3	15	0.5	0.1
Digestive System	3,040	129.1	2.4	3,035	86.5	1.6
Esophagus	231	9.6	0.6	91	2.7	0.3
Stomach	324	13.8	0.8	241	6.6	0.4
Small Intestine	55	2.3	0.3	54	1.6	0.2
Colon and Rectum	1,794	76.4	1.8	1,957	55.4	1.3
Colon excluding Rectum	1,242	53.2	1.5	1,501	42.3	1.1
Rectum and Rectosigmoid Junction	552	23.2	1.0	456	13.2	0.6
Anus, Anal Canal and Anorectum	29	1.2	0.2	53	1.7	0.2
Liver	160	6.6	0.5	69	2.0	0.2
Intrahepatic Bile Duct	34	1.4	0.2	29	0.9	0.2
Gallbladder	31	1.4	0.2	54	1.6	0.2
Pancreas	303	12.9	0.8	367	10.4	0.6
Respiratory System	2,748	114.8	2.2	2,085	64.4	1.4
Larynx	211	8.8	0.6	64	2.0	0.3
Lung and Bronchus	2,451	102.3	2.1	1,985	61.3	1.4
Bones and Joints	21	0.8	0.2	16	0.6	0.1
Soft Tissue including Heart	97	4.1	0.4	92	3.1	0.3
Skin excluding Basal and Squamous	654	27.3	1.1	477	15.8	0.7
Melanoma of the Skin	570	23.8	1.0	415	13.8	0.7
Breast	33	1.5	0.3	4,062	131.2	2.1
Female Genital System	0	0.0	~	1,699	55.6	1.4
Cervix Uteri	0	0.0	~	245	8.8	0.6
Corpus and Uterus, NOS	0	0.0	~	842	27.1	1.0
Ovary	0	0.0	~	442	14.5	0.7
Male Genital System	4,435	184.4	2.8	0	0.0	~
Prostate	4,251	177.1	2.7	0	0.0	~
Testis	156	6.1	0.5	0	0.0	~
Penis	18	0.8	0.2	0	0.0	~
Urinary System	1,759	74.2	1.8	805	24.3	0.9
Urinary Bladder	1,240	52.7	1.5	467	13.9	0.7
Kidney and Renal Pelvis	488	20.2	0.9	320	10.0	0.6
Ureter	23	1.0	0.2	15	0.4	0.1
Eye and Orbit	16	0.6	0.2	21	0.7	0.2
Brain and Other Nervous System	202	8.2	0.6	194	6.4	0.5
Brain	195	7.9	0.6	179	5.9	0.4
Endocrine System	108	4.3	0.4	348	12.6	0.7
Thyroid	89	3.6	0.4	327	11.8	0.7
Lymphoma	670	27.9	1.1	665	20.7	0.8
Hodgkin Lymphoma	90	3.6	0.4	90	3.2	0.3
Non-Hodgkin Lymphoma	580	24.3	1.0	575	17.5	0.7
Myeloma	159	6.8	0.5	148	4.4	0.4
Leukemia	422	17.9	0.9	291	9.0	0.5
Acute Lymphocytic Leukemia	55	2.3	0.3	37	1.5	0.2
Chronic Lymphocytic Leukemia	126	5.4	0.5	80	2.3	0.3
Acute Myeloid Leukemia	121	5.1	0.5	92	2.8	0.3
Acute Monocytic Leukemia	8	0.3	0.1	5	0.2	0.1
Chronic Myeloid Leukemia	56	2.3	0.3	37	1.1	0.2
Miscellaneous	364	16.0	0.8	387	10.8	0.6

~ Statistic could not be calculated.

Table 2 Total Cancer Cases and Average Annual Age-adjusted Cancer Incidence Rates (U.S. Year 2000 Standard) Rhode Island, 1997-2001, Whites, by Sex and Anatomical Site

	Males (Whites)			Females (Whites)		
SITES	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Sites	14,513	651.3	5.4	14,025	471.7	4.1
Oral Cavity and Pharynx	354	15.8	0.8	190	6.5	0.5
Lip	27	1.3	0.3	19	0.6	0.1
Tongue	102	4.5	0.5	53	1.9	0.3
Salivary Gland	31	1.4	0.3	34	1.1	0.2
Floor of Mouth	26	1.2	0.2	11	0.3	0.1
Gum and Other Mouth	46	2.1	0.3	36	1.2	0.2
Nasopharynx	19	0.9	0.2	4	0.1	0.1
Oropharynx	30	1.3	0.2	10	0.4	0.1
Hypopharynx	38	1.7	0.3	12	0.4	0.1
Digestive System	2,929	132.5	2.5	2,937	88.9	1.7
Esophagus	225	10.0	0.7	86	2.7	0.3
Stomach	308	14.0	0.8	227	6.6	0.5
Small Intestine	52	2.3	0.3	54	1.8	0.2
Colon and Rectum	1,748	79.1	1.9	1,901	57.0	1.3
Colon excluding Rectum	1,208	54.9	1.6	1,465	43.7	1.2
Rectum and Rectosigmoid Junction	540	24.2	1.0	436	13.4	0.7
Anus, Anal Canal and Anorectum	28	1.3	0.2	52	1.8	0.3
Liver	144	6.5	0.5	66	2.0	0.3
Intrahepatic Bile Duct	32	1.4	0.2	28	1.0	0.2
Gallbladder	28	1.3	0.2	52	1.6	0.2
Pancreas	291	13.2	0.8	354	10.7	0.6
Respiratory System	2,650	117.8	2.3	2,026	67.0	1.5
Larynx	198	8.8	0.6	61	2.0	0.3
Lung and Bronchus	2,367	105.1	2.2	1,929	63.8	1.5
Bones and Joints	19	0.9	0.2	14	0.6	0.2
Soft Tissue including Heart	95	4.4	0.5	86	3.3	0.4
Skin excluding Basal and Squamous	622	28.1	1.1	458	16.6	0.8
Melanoma of the Skin	545	24.6	1.1	396	14.5	0.7
Breast	29	1.4	0.3	3,924	137.2	2.2
Female Genital System	0	0.0	~	1,633	58.2	1.5
Cervix Uteri	0	0.0	~	229	9.3	0.6
Corpus and Uterus, NOS	0	0.0	~	812	28.3	1.0
Ovary	0	0.0	~	427	15.2	0.8
Male Genital System	4,238	188.1	2.9	0	0.0	~
Prostate	4,062	180.0	2.8	0	0.0	~
Testis	151	6.9	0.6	0	0.0	~
Penis	16	0.7	0.2	0	0.0	~
Urinary System	1,721	77.4	1.9	785	25.4	0.9
Urinary Bladder	1,224	55.2	1.6	461	14.6	0.7
Kidney and Renal Pelvis	467	20.8	1.0	306	10.3	0.6
Ureter	22	1.0	0.2	15	0.4	0.1
Eye and Orbit	14	0.6	0.2	19	0.7	0.2
Brain and Other Nervous System	200	9.1	0.6	189	7.0	0.5
Brain	193	8.7	0.6	174	6.4	0.5
Endocrine System	100	4.5	0.5	325	13.3	0.7
Thyroid	82	3.7	0.4	307	12.6	0.7
Lymphoma	636	28.8	1.1	635	21.5	0.9
Hodgkin Lymphoma	84	3.8	0.4	83	3.4	0.4
Non-Hodgkin Lymphoma	552	24.9	1.1	552	18.0	0.8
Myeloma	151	6.9	0.6	142	4.5	0.4
Leukemia	408	18.9	0.9	285	9.8	0.6
Acute Lymphocytic Leukemia	54	2.7	0.4	36	1.8	0.3
Chronic Lymphocytic Leukemia	121	5.5	0.5	80	2.4	0.3
Acute Myeloid Leukemia	115	5.3	0.5	87	2.9	0.3
Acute Monocytic Leukemia	8	0.4	0.1	5	0.2	0.1
Chronic Myeloid Leukemia	55	2.5	0.3	37	1.2	0.2
Miscellaneous	347	16.1	0.9	377	11.1	0.6

~ Statistic could not be calculated.

Table 3 Total Cancer Cases and Average Annual Age-adjusted Cancer Incidence Rates (U.S. Year 2000 Standard) Rhode Island, 1997-2001, Blacks, by Sex and Anatomical Site

	Males (Blacks)			Females (Blacks)		
SITES	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Sites	391	674.8	37.7	315	422.5	24.7
Oral Cavity and Pharynx	7	9.6	3.7	9	11.4	3.9
Lip	0	0.0	~	0	0.0	~
Tongue	1	1.3	1.3	2	2.3	1.6
Salivary Gland	0	0.0	~	1	2.1	2.1
Floor of Mouth	2	2.3	1.6	0	0.0	~
Gum and Other Mouth	0	0.0	~	2	2.1	1.5
Nasopharynx	2	2.6	1.9	0	0.0	~
Oropharynx	0	0.0	~	0	0.0	~
Hypopharynx	0	0.0	~	3	3.9	2.2
Digestive System	67	129.4	17.6	68	102.1	12.8
Esophagus	5	7.1	3.3	4	6.0	3.0
Stomach	9	17.3	6.0	13	19.1	5.5
Small Intestine	2	5.6	4.1	0	0.0	~
Colon and Rectum	28	57.5	12.1	36	54.6	9.4
Colon excluding Rectum	20	41.7	10.6	26	37.9	7.7
Rectum and Rectosigmoid Junction	8	15.8	5.9	10	16.7	5.4
Anus, Anal Canal and Anorectum	1	0.7	0.7	0	0.0	~
Liver	6	8.7	3.7	0	0.0	~
Intrahepatic Bile Duct	1	1.9	1.9	1	1.4	1.4
Gallbladder	2	9.2	6.8	1	1.2	1.2
Pancreas	10	16.2	5.2	12	17.9	5.4
Respiratory System	79	138.7	17.4	51	71.0	10.2
Larynx	9	14.7	5.2	3	4.1	2.4
Lung and Bronchus	70	124.1	16.6	48	66.9	9.9
Bones and Joints	1	0.9	0.9	1	0.8	0.8
Soft Tissue including Heart	1	1.3	1.3	3	2.8	1.7
Skin excluding Basal and Squamous	6	5.0	2.1	1	1.2	1.2
Melanoma of the Skin	0	0.0	~	1	1.2	1.2
Breast	3	5.7	3.3	93	120.3	12.8
Female Genital System	0	0.0	~	29	38.1	7.3
Cervix Uteri	0	0.0	~	8	9.1	3.3
Corpus and Uterus, NOS	0	0.0	~	14	20.4	5.6
Ovary	0	0.0	~	5	6.0	2.8
Male Genital System	147	261.9	23.3	0	0.0	~
Prostate	141	253.6	23.0	0	0.0	~
Testis	3	2.2	1.3	0	0.0	~
Penis	2	5.2	3.8	0	0.0	~
Urinary System	26	41.5	8.7	16	21.9	5.7
Urinary Bladder	10	17.3	5.9	6	9.8	4.1
Kidney and Renal Pelvis	16	24.2	6.3	10	12.1	4.0
Ureter	0	0.0	~	0	0.0	~
Eye and Orbit	0	0.0	~	0	0.0	~
Brain and Other Nervous System	2	1.9	1.3	3	4.5	2.7
Brain	2	1.9	1.3	3	4.5	2.7
Endocrine System	5	5.4	2.5	11	10.5	3.3
Thyroid	5	5.4	2.5	10	9.3	3.0
Lymphoma	23	28.4	6.3	17	19.5	5.0
Hodgkin Lymphoma	5	4.4	2.0	6	5.8	2.5
Non-Hodgkin Lymphoma	18	24.0	5.9	11	13.7	4.3
Myeloma	6	10.9	4.6	5	7.8	3.5
Leukemia	6	7.4	3.3	2	2.7	2.2
Acute Lymphocytic Leukemia	0	0.0	~	0	0.0	~
Chronic Lymphocytic Leukemia	1	1.0	1.0	0	0.0	~
Acute Myeloid Leukemia	4	4.8	2.7	2	2.7	2.2
Acute Monocytic Leukemia	0	0.0	~	0	0.0	~
Chronic Myeloid Leukemia	1	1.6	1.6	0	0.0	~
Miscellaneous	12	26.6	9.0	6	7.9	3.4

~ Statistic could not be calculated.

Table 4 Total Cancer Cases and Average Annual Age-adjusted Cancer Incidence Rates (U.S. Year 1970 Standard) Rhode Island, 1997-2001, All Races, by Sex and Anatomical Site

	Males (All Races)			Females (All Races)		
SITES	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Sites	15,093	523.0	4.3	14,530	378.7	3.4
Oral Cavity and Pharynx	365	12.9	0.7	205	5.4	0.4
Lip	27	0.9	0.2	19	0.5	0.1
Tongue	103	3.6	0.4	56	1.6	0.2
Salivary Gland	33	1.2	0.2	36	0.9	0.2
Floor of Mouth	28	1.0	0.2	14	0.3	0.1
Gum and Other Mouth	46	1.6	0.2	38	1.0	0.2
Nasopharynx	22	0.8	0.2	4	0.1	0.0
Oropharynx	30	1.1	0.2	11	0.3	0.1
Hypopharynx	39	1.4	0.2	15	0.4	0.1
Digestive System	3,040	103.1	1.9	3,035	68.2	1.4
Esophagus	231	8.2	0.5	91	2.2	0.2
Stomach	324	10.6	0.6	241	5.0	0.4
Small Intestine	55	1.8	0.3	54	1.4	0.2
Colon and Rectum	1,794	60.7	1.5	1,957	43.5	1.1
Colon excluding Rectum	1,242	41.6	1.2	1,501	33.0	0.9
Rectum and Rectosigmoid Junction	552	19.1	0.8	456	10.4	0.5
Anus, Anal Canal and Anorectum	29	1.0	0.2	53	1.4	0.2
Liver	160	5.6	0.5	69	1.6	0.2
Intrahepatic Bile Duct	34	1.1	0.2	29	0.8	0.2
Gallbladder	31	1.0	0.2	54	1.3	0.2
Pancreas	303	10.4	0.6	367	8.2	0.5
Respiratory System	2,748	95.7	1.9	2,085	55.2	1.3
Larynx	211	7.6	0.5	64	1.7	0.2
Lung and Bronchus	2,451	85.1	1.7	1,985	52.6	1.3
Bones and Joints	21	0.8	0.2	16	0.5	0.1
Soft Tissue including Heart	97	3.3	0.3	92	2.8	0.3
Skin excluding Basal and Squamous	654	22.4	0.9	477	13.2	0.6
Melanoma of the Skin	570	19.6	0.8	415	11.6	0.6
Breast	33	1.1	0.2	4,062	110.3	1.8
Female Genital System	0	0.0	~	1,699	47.8	1.2
Cervix Uteri	0	0.0	~	245	7.3	0.5
Corpus and Uterus, NOS	0	0.0	~	842	23.7	0.9
Ovary	0	0.0	~	442	12.5	0.6
Male Genital System	4,435	156.6	2.4	0	0.0	~
Prostate	4,251	150.5	2.3	0	0.0	~
Testis	156	5.2	0.4	0	0.0	~
Penis	18	0.6	0.1	0	0.0	~
Urinary System	1,759	60.0	1.5	805	20.3	0.8
Urinary Bladder	1,240	42.0	1.2	467	11.4	0.6
Kidney and Renal Pelvis	488	16.9	0.8	320	8.6	0.5
Ureter	23	0.8	0.2	15	0.3	0.1
Eye and Orbit	16	0.5	0.1	21	0.7	0.2
Brain and Other Nervous System	202	7.1	0.5	194	5.9	0.5
Brain	195	6.8	0.5	179	5.4	0.4
Endocrine System	108	3.9	0.4	348	10.9	0.6
Thyroid	89	3.1	0.3	327	10.2	0.6
Lymphoma	670	23.1	0.9	665	17.6	0.7
Hodgkin Lymphoma	90	3.3	0.4	90	3.1	0.3
Non-Hodgkin Lymphoma	580	19.9	0.8	575	14.5	0.7
Myeloma	159	5.3	0.4	148	3.6	0.3
Leukemia	422	15.0	0.8	291	8.0	0.5
Acute Lymphocytic Leukemia	55	2.5	0.3	37	1.8	0.3
Chronic Lymphocytic Leukemia	126	4.4	0.4	80	1.8	0.2
Acute Myeloid Leukemia	121	4.2	0.4	92	2.3	0.3
Acute Monocytic Leukemia	8	0.3	0.1	5	0.2	0.1
Chronic Myeloid Leukemia	56	1.9	0.3	37	0.9	0.2
Miscellaneous	364	12.1	0.6	387	8.4	0.5

~ Statistic could not be calculated.

Table 5 Total Cancer Cases and Average Annual Age-adjusted Cancer Incidence Rates (U.S. Year 1970 Standard) Rhode Island, 1997-2001, Whites, by Sex and Anatomical Site

	Males (Whites)			Females (Whites)		
SITES	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Sites	14,513	539.0	4.6	14,025	395.9	3.6
Oral Cavity and Pharynx	354	13.5	0.7	190	5.4	0.4
Lip	27	0.9	0.2	19	0.5	0.1
Tongue	102	3.9	0.4	53	1.6	0.2
Salivary Gland	31	1.1	0.2	34	0.9	0.2
Floor of Mouth	26	1.0	0.2	11	0.3	0.1
Gum and Other Mouth	46	1.7	0.3	36	1.0	0.2
Nasopharynx	19	0.7	0.2	4	0.1	0.0
Oropharynx	30	1.2	0.2	10	0.3	0.1
Hypopharynx	38	1.5	0.2	12	0.3	0.1
Digestive System	2,929	105.9	2.0	2,937	70.4	1.4
Esophagus	225	8.5	0.6	86	2.2	0.3
Stomach	308	10.8	0.6	227	5.1	0.4
Small Intestine	52	1.8	0.3	54	1.5	0.2
Colon and Rectum	1,748	63.0	1.5	1,901	44.9	1.1
Colon excluding Rectum	1,208	43.0	1.3	1,465	34.3	1.0
Rectum and Rectosigmoid Junction	540	20.0	0.9	436	10.7	0.6
Anus, Anal Canal and Anorectum	28	1.0	0.2	52	1.5	0.2
Liver	144	5.4	0.5	66	1.6	0.2
Intrahepatic Bile Duct	32	1.1	0.2	28	0.8	0.2
Gallbladder	28	1.0	0.2	52	1.3	0.2
Pancreas	291	10.6	0.6	354	8.5	0.5
Respiratory System	2,650	98.4	1.9	2,026	57.6	1.4
Larynx	198	7.7	0.6	61	1.7	0.2
Lung and Bronchus	2,367	87.6	1.8	1,929	54.8	1.3
Bones and Joints	19	0.9	0.2	14	0.5	0.2
Soft Tissue including Heart	95	3.5	0.4	86	2.9	0.4
Skin excluding Basal and Squamous	622	23.1	0.9	458	13.9	0.7
Melanoma of the Skin	545	20.3	0.9	396	12.2	0.6
Breast	29	1.0	0.2	3,924	115.4	2.0
Female Genital System	0	0.0	~	1,633	50.1	1.3
Cervix Uteri	0	0.0	~	229	7.6	0.5
Corpus and Uterus, NOS	0	0.0	~	812	24.8	0.9
Ovary	0	0.0	~	427	13.2	0.7
Male Genital System	4,238	159.9	2.5	0	0.0	~
Prostate	4,062	153.1	2.4	0	0.0	~
Testis	151	5.9	0.5	0	0.0	~
Penis	16	0.5	0.1	0	0.0	~
Urinary System	1,721	62.6	1.5	785	21.3	0.8
Urinary Bladder	1,224	44.2	1.3	461	12.1	0.6
Kidney and Renal Pelvis	467	17.4	0.8	306	8.9	0.6
Ureter	22	0.8	0.2	15	0.3	0.1
Eye and Orbit	14	0.5	0.1	19	0.6	0.1
Brain and Other Nervous System	200	7.9	0.6	189	6.5	0.5
Brain	193	7.6	0.6	174	5.9	0.5
Endocrine System	100	4.1	0.4	325	11.5	0.7
Thyroid	82	3.2	0.4	307	10.8	0.6
Lymphoma	636	23.9	1.0	635	18.4	0.8
Hodgkin Lymphoma	84	3.5	0.4	83	3.4	0.4
Non-Hodgkin Lymphoma	552	20.4	0.9	552	15.0	0.7
Myeloma	151	5.3	0.4	142	3.8	0.3
Leukemia	408	16.1	0.8	285	8.8	0.6
Acute Lymphocytic Leukemia	54	3.0	0.4	36	2.1	0.4
Chronic Lymphocytic Leukemia	121	4.5	0.4	80	1.9	0.2
Acute Myeloid Leukemia	115	4.4	0.4	87	2.4	0.3
Acute Monocytic Leukemia	8	0.3	0.1	5	0.2	0.1
Chronic Myeloid Leukemia	55	2.1	0.3	37	1.0	0.2
Miscellaneous	347	12.2	0.7	377	8.7	0.5

~ Statistic could not be calculated.

Table 6 Total Cancer Cases and Average Annual Age-adjusted Cancer Incidence Rates (U.S. Year 1970 Standard) Rhode Island, 1997-2001, Blacks, by Sex and Anatomical Site

	Males (Blacks)			Females (Blacks)		
SITES	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Sites	391	565.3	29.8	315	342.6	19.8
Oral Cavity and Pharynx	7	8.7	3.4	9	9.5	3.2
Lip	0	0.0	~	0	0.0	~
Tongue	1	1.1	1.1	2	2.2	1.6
Salivary Gland	0	0.0	~	1	1.0	1.0
Floor of Mouth	2	1.9	1.4	0	0.0	~
Gum and Other Mouth	0	0.0	~	2	1.9	1.4
Nasopharynx	2	2.4	1.8	0	0.0	~
Oropharynx	0	0.0	~	0	0.0	~
Hypopharynx	0	0.0	~	3	3.5	2.0
Digestive System	67	102.5	13.0	68	74.5	9.2
Esophagus	5	6.6	3.1	4	4.6	2.3
Stomach	9	14.0	4.8	13	13.7	3.9
Small Intestine	2	3.7	2.6	0	0.0	~
Colon and Rectum	28	43.8	8.6	36	40.3	6.8
Colon excluding Rectum	20	31.0	7.3	26	28.4	5.7
Rectum and Rectosigmoid Junction	8	12.8	4.6	10	11.9	3.8
Anus, Anal Canal and Anorectum	1	0.6	0.6	0	0.0	~
Liver	6	8.2	3.5	0	0.0	~
Intrahepatic Bile Duct	1	1.6	1.6	1	1.2	1.2
Gallbladder	2	4.9	3.5	1	1.2	1.2
Pancreas	10	14.8	4.8	12	12.4	3.6
Respiratory System	79	115.4	13.5	51	60.2	8.5
Larynx	9	13.2	4.5	3	3.7	2.2
Lung and Bronchus	70	102.3	12.7	48	56.4	8.2
Bones and Joints	1	0.7	0.7	1	0.6	0.6
Soft Tissue including Heart	1	1.1	1.1	3	2.7	1.6
Skin excluding Basal and Squamous	6	4.2	1.7	1	1.2	1.2
Melanoma of the Skin	0	0.0	~	1	1.2	1.2
Breast	3	4.8	2.8	93	101.4	10.8
Female Genital System	0	0.0	~	29	31.9	6.1
Cervix Uteri	0	0.0	~	8	7.2	2.7
Corpus and Uterus, NOS	0	0.0	~	14	16.9	4.6
Ovary	0	0.0	~	5	5.6	2.6
Male Genital System	147	225.5	19.1	0	0.0	~
Prostate	141	218.9	18.8	0	0.0	~
Testis	3	2.2	1.3	0	0.0	~
Penis	2	3.7	2.6	0	0.0	~
Urinary System	26	35.6	7.3	16	16.7	4.3
Urinary Bladder	10	14.2	4.7	6	6.8	2.8
Kidney and Renal Pelvis	16	21.4	5.6	10	9.9	3.3
Ureter	0	0.0	~	0	0.0	~
Eye and Orbit	0	0.0	~	0	0.0	~
Brain and Other Nervous System	2	1.4	1.0	3	3.6	2.1
Brain	2	1.4	1.0	3	3.6	2.1
Endocrine System	5	4.8	2.3	11	9.4	2.9
Thyroid	5	4.8	2.3	10	8.1	2.6
Lymphoma	23	24.9	5.6	17	16.8	4.3
Hodgkin Lymphoma	5	4.1	1.9	6	5.4	2.3
Non-Hodgkin Lymphoma	18	20.8	5.3	11	11.4	3.6
Myeloma	6	9.3	3.8	5	5.7	2.5
Leukemia	6	6.1	2.7	2	1.8	1.3
Acute Lymphocytic Leukemia	0	0.0	~	0	0.0	~
Chronic Lymphocytic Leukemia	1	0.8	0.8	0	0.0	~
Acute Myeloid Leukemia	4	3.7	2.0	2	1.8	1.3
Acute Monocytic Leukemia	0	0.0	~	0	0.0	~
Chronic Myeloid Leukemia	1	1.6	1.6	0	0.0	~
Miscellaneous	12	20.1	6.1	6	6.6	2.8

~ Statistic could not be calculated.

Table 7 Total Cancer Cases and Average Annual Age-adjusted Cancer Incidence Rates (U.S. Year 2000 Standard) Rhode Island Counties, 1997-2001, All Races, by Sex and Selected Anatomical Site

	Males (All Races)			Females (All Races)		
Counties / Sites	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Counties						
All Sites	15,093	633.1	5.2	14,530	452.6	3.8
Colon and Rectum	1,794	76.4	1.8	1,957	55.4	1.3
Lung and Bronchus	2,451	102.3	2.1	1,985	61.3	1.4
Melanoma of the Skin	570	23.8	1.0	415	13.8	0.7
Breast	33	1.5	0.3	4,062	131.2	2.1
Cervix Uteri	0	0.0	~	245	8.8	0.6
Prostate	4,251	177.1	2.7	0	0.0	~
Bristol County						
All Sites	838	633.0	22.1	731	433.6	16.4
Colon and Rectum	102	79.3	8.0	90	47.5	5.1
Lung and Bronchus	126	93.5	8.4	79	44.4	5.1
Melanoma of the Skin	38	29.8	4.9	22	13.9	3.0
Breast	3	2.1	1.2	223	141.2	9.6
Cervix Uteri	0	0.0	~	4	2.9	1.5
Prostate	236	175.9	11.6	0	0.0	~
Kent County						
All Sites	2,661	664.7	13.1	2,530	476.2	9.6
Colon and Rectum	347	88.6	4.9	317	55.2	3.1
Lung and Bronchus	464	113.4	5.3	363	66.9	3.6
Melanoma of the Skin	99	23.9	2.4	79	15.9	1.8
Breast	3	0.7	0.4	748	143.9	5.3
Cervix Uteri	0	0.0	~	42	9.0	1.4
Prostate	697	172.6	6.6	0	0.0	~
Newport County						
All Sites	1,272	620.5	17.6	1,265	482.4	13.7
Colon and Rectum	151	75.0	6.2	173	61.7	4.8
Lung and Bronchus	165	79.7	6.3	196	74.2	5.3
Melanoma of the Skin	59	28.0	3.7	44	17.6	2.7
Breast	2	0.9	0.6	352	136.8	7.4
Cervix Uteri	0	0.0	~	16	6.8	1.7
Prostate	451	217.1	10.3	0	0.0	~
Providence County						
All Sites	8,483	618.2	6.7	8,440	443.0	5.0
Colon and Rectum	991	72.9	2.3	1,177	54.8	1.7
Lung and Bronchus	1,435	104.4	2.8	1,124	58.7	1.8
Melanoma of the Skin	292	21.3	1.3	214	12.3	0.9
Breast	22	1.7	0.4	2,245	123.1	2.7
Cervix Uteri	0	0.0	~	161	10.0	0.8
Prostate	2,270	165.1	3.5	0	0.0	~
Washington County						
All Sites	1,837	671.6	15.9	1,564	454.5	11.5
Colon and Rectum	202	76.2	5.5	200	56.2	4.0
Lung and Bronchus	261	94.9	5.9	223	65.5	4.4
Melanoma of the Skin	82	29.2	3.3	56	16.3	2.2
Breast	3	1.0	0.6	494	145.1	6.6
Cervix Uteri	0	0.0	~	22	6.7	1.4
Prostate	597	217.3	9.0	0	0.0	~

~ Statistic could not be calculated.

Table 8 Total Cancer Cases and Average Annual Age-adjusted Cancer Incidence Rates (U.S. Year 1970 Standard) Rhode Island Counties, 1997-2001, All Races, by Sex and Selected Anatomical Site

	Males (All Races)			Females (All Races)		
Counties / Sites	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Counties						
All Sites	15,093	523.0	4.3	14,530	378.7	3.4
Colon and Rectum	1,794	60.7	1.5	1,957	43.5	1.1
Lung and Bronchus	2,451	85.1	1.7	1,985	52.6	1.3
Melanoma of the Skin	570	19.6	0.8	415	11.6	0.6
Breast	33	1.1	0.2	4,062	110.3	1.8
Cervix Uteri	0	0.0	~	245	7.3	0.5
Prostate	4,251	150.5	2.3	0	0.0	~
Bristol County						
All Sites	838	517.8	18.3	731	360.0	14.3
Colon and Rectum	102	60.5	6.1	90	36.2	4.1
Lung and Bronchus	126	75.2	6.9	79	37.6	4.5
Melanoma of the Skin	38	25.0	4.1	22	11.4	2.6
Breast	3	1.8	1.0	223	118.1	8.3
Cervix Uteri	0	0.0	~	4	2.1	1.1
Prostate	236	148.9	9.9	0	0.0	~
Kent County						
All Sites	2,661	545.5	10.7	2,530	402.9	8.5
Colon and Rectum	347	69.7	3.8	317	44.0	2.6
Lung and Bronchus	464	95.5	4.5	363	57.6	3.2
Melanoma of the Skin	99	20.1	2.0	79	13.1	1.5
Breast	3	0.6	0.4	748	122.9	4.7
Cervix Uteri	0	0.0	~	42	7.7	1.2
Prostate	697	144.4	5.5	0	0.0	~
Newport County						
All Sites	1,272	518.6	14.7	1,265	406.1	12.1
Colon and Rectum	151	59.6	4.9	173	48.5	4.0
Lung and Bronchus	165	67.9	5.3	196	64.4	4.8
Melanoma of the Skin	59	23.7	3.1	44	14.7	2.3
Breast	2	0.9	0.6	352	116.3	6.4
Cervix Uteri	0	0.0	~	16	5.5	1.4
Prostate	451	187.6	8.9	0	0.0	~
Providence County						
All Sites	8,483	510.9	5.7	8,440	369.1	4.4
Colon and Rectum	991	58.3	1.9	1,177	42.7	1.4
Lung and Bronchus	1,435	86.5	2.3	1,124	50.0	1.6
Melanoma of the Skin	292	17.2	1.0	214	10.4	0.7
Breast	22	1.2	0.3	2,245	102.8	2.3
Cervix Uteri	0	0.0	~	161	8.2	0.7
Prostate	2,270	140.3	3.0	0	0.0	~
Washington County						
All Sites	1,837	556.4	13.1	1,564	381.0	10.0
Colon and Rectum	202	60.5	4.3	200	44.7	3.3
Lung and Bronchus	261	79.7	5.0	223	57.1	3.9
Melanoma of the Skin	82	24.3	2.7	56	13.7	1.9
Breast	3	1.0	0.6	494	121.7	5.7
Cervix Uteri	0	0.0	~	22	5.5	1.2
Prostate	597	184.6	7.6	0	0.0	~

~ Statistic could not be calculated.

Table 9 Estimated Number of Rhode Islanders Alive in the Year 2000 Diagnosed with Cancer in the Past 20 Years (1981-2000), by Race, Sex and Selected Anatomical Site

	Males			Females		
Sites	*All Races*	*Whites*	*Blacks*	*All Races*	*Whites*	*Blacks*
All Sites	14679	14042	349	17703	17200	332
Colon and Rectum	1780	1687	36	2023	1927	41
Lung and Bronchus	647	599	20	632	620	14
Melanomas of the Skin	850	894	1	881	934	1
Breast	~	~	~	7401	7242	139
Cervix	~	~	~	578	494	22
Prostate	6132	5770	180	~	~	~

~ Statistic could not be calculated.

Table 10 Total Cancer Deaths and Average Annual Age-adjusted Cancer Mortality Rates (U.S. Year 2000 Standard) Rhode Island, 1996-2000, All Races by Sex and Anatomical Site

	Males (All Races)			Females (All Races)		
SITES	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Malignant Cancers	6,188	270.7	3.5	6,171	179.0	2.3
Oral Cavity and Pharynx	79	3.4	0.4	64	1.8	0.2
Lip	0	0.0	~	0	0.0	~
Tongue	23	1.0	0.2	16	0.4	0.1
Salivary Gland	2	0.1	0.1	10	0.3	0.1
Floor of Mouth	1	0.0	0.0	2	0.1	0.0
Gum and Other Mouth	13	0.6	0.2	11	0.3	0.1
Nasopharynx	4	0.2	0.1	7	0.2	0.1
Oropharynx	10	0.4	0.1	3	0.1	0.1
Hypopharynx	4	0.2	0.1	2	0.1	0.1
Digestive System	1,615	70.8	1.8	1,522	41.7	1.1
Esophagus	194	8.3	0.6	76	2.1	0.2
Stomach	215	9.5	0.7	153	4.2	0.3
Small Intestine	7	0.3	0.1	15	0.4	0.1
Colon and Rectum	648	28.9	1.2	747	20.1	0.8
Colon excluding Rectum	537	24.1	1.1	648	17.4	0.7
Rectum and Rectosigmoid Junction	111	4.8	0.5	99	2.7	0.3
Anus, Anal Canal and Anorectum	5	0.2	0.1	4	0.1	0.1
Liver	137	5.8	0.5	57	1.6	0.2
Gallbladder	20	0.9	0.2	31	0.9	0.2
Pancreas	328	14.1	0.8	347	9.7	0.5
Respiratory System	2,120	90.4	2.0	1,534	46	1.2
Larynx	88	3.8	0.4	23	0.7	0.1
Lung and Bronchus	2,016	85.9	1.9	1,500	45	1.2
Bones and Joints	9	0.4	0.1	11	0.4	0.1
Soft Tissue including Heart	50	2.1	0.3	47	1.4	0.2
Skin excluding Basal and Squamous	115	5.3	0.5	107	3.1	0.3
Melanomas of the Skin	75	3.3	0.4	82	2.5	0.3
Breast	6	0.3	0.1	970	29.2	1.0
Female Genital System	0	0.0	~	519	15.8	0.7
Cervix	0	0.0	~	84	2.8	0.3
Corpus	0	0.0	~	66	2.0	0.3
Uterus, NOS	0	0.0	~	53	1.5	0.2
Ovary	0	0.0	~	287	8.7	0.5
Male Genital System	714	33.6	1.3	0	0.0	~
Prostate	702	33.1	1.3	0	0.0	~
Testis	9	0.3	0.1	0	0.0	~
Penis	1	0.0	0.0	0	0.0	~
Urinary System	325	14.5	0.8	233	6.4	0.4
Urinary Bladder	182	8.3	0.6	115	3.1	0.3
Kidney and Renal Pelvis	136	6.0	0.5	109	3.1	0.3
Ureter	4	0.2	0.1	4	0.1	0.0
Eye and Orbit	2	0.1	0.1	2	0.0	0.0
Brain and Other Nervous System	145	6.0	0.5	155	4.7	0.4
Brain	144	0.0	0.5	153	4.6	0.4
Endocrine System	19	0.8	0.2	22	0.7	0.1
Thyroid	16	0.7	0.2	14	0.4	0.1
Lymphomas	294	12.7	0.7	297	8.3	0.5
Hodgkins Disease	16	0.7	0.2	19	0.6	0.1
Non-Hodgkins Lymphomas	278	12.0	0.7	278	7.8	0.5
Multiple Myeloma	79	3.5	0.4	97	2.8	0.3
Leukemias	235	10.3	0.7	181	5.3	0.4
Acute Lymphocytic Leukemia	18	0.8	0.2	16	0.5	0.1
Chronic Lymphocytic Leukemia	54	2.5	0.3	28	0.7	0.1
Other Lymphocytic Leukemia	11	0.5	0.1	6	0.2	0.1
Acute Myeloid Leukemia	71	3.0	0.4	58	1.8	0.2
Chronic Myeloid Leukemia	16	0.7	0.2	18	0.6	0.1
Monocytic Leukemia	5	0.2	0.1	3	0.1	0.0
Other Leukemia	55	2.4	0.3	50	1.5	0.2
Miscellaneous Malignant Cancer	381	16.6	0.9	410	11.4	0.6

~ Statistic could not be calculated.

Table 11 Total Cancer Deaths and Average Annual Age-adjusted Cancer Mortality Rates (U.S. Year 2000 Standard) Rhode Island, 1996-2000, Whites by Sex and Anatomical Site

	Males (Whites)			Females (Whites)		
SITES	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Malignant Cancers	6,009	277.9	3.6	5,998	184.4	2.5
Oral Cavity and Pharynx	77	3.6	0.4	62	1.8	0.2
Lip	0	0.0	~	0	0.0	~
Tongue	22	1.1	0.2	16	0.5	0.1
Salivary Gland	2	0.1	0.1	10	0.3	0.1
Floor of Mouth	1	0.0	0.0	2	0.1	0.0
Gum and Other Mouth	13	0.6	0.2	10	0.3	0.1
Nasopharynx	4	0.2	0.1	7	0.2	0.1
Oropharynx	10	0.5	0.1	3	0.1	0.1
Hypopharynx	4	0.2	0.1	1	0.0	0.0
Digestive System	1,566	72.5	1.9	1,477	42.5	1.1
Esophagus	186	8.4	0.6	74	2.2	0.3
Stomach	207	9.7	0.7	149	4.3	0.4
Small Intestine	6	0.3	0.1	15	0.4	0.1
Colon and Rectum	636	29.9	1.2	726	20.5	0.8
Colon excluding Rectum	526	24.8	1.1	629	17.7	0.7
Rectum and Rectosigmoid Junction	110	5.0	0.5	97	2.8	0.3
Anus, Anal Canal and Anorectum	5	0.2	0.1	3	0.1	0.1
Liver	132	6.0	0.5	57	1.7	0.2
Gallbladder	19	0.9	0.2	31	1.0	0.2
Pancreas	317	14.4	0.8	335	9.9	0.6
Respiratory System	2,057	92.6	2.1	1,496	47.6	1.3
Larynx	87	3.9	0.4	22	0.7	0.1
Lung and Bronchus	1,954	88.0	2.0	1,463	46.6	1.2
Bones and Joints	9	0.5	0.2	10	0.4	0.1
Soft Tissue including Heart	49	2.2	0.3	45	1.5	0.2
Skin excluding Basal and Squamous	115	5.6	0.5	105	3.3	0.3
Melanomas of the Skin	75	3.5	0.4	80	2.6	0.3
Breast	6	0.3	0.1	944	30.2	1.0
Female Genital System	0	0.0	~	503	16.3	0.7
Cervix	0	0.0	~	81	3.0	0.3
Corpus	0	0.0	~	62	2.0	0.3
Uterus, NOS	0	0.0	~	52	1.6	0.2
Ovary	0	0.0	~	279	8.9	0.5
Male Genital System	688	33.9	1.3	0	0.0	~
Prostate	676	33.3	1.3	0	0.0	~
Testis	9	0.4	0.1	0	0.0	~
Penis	1	0.0	0.0	0	0.0	~
Urinary System	320	15.1	0.9	229	6.7	0.5
Urinary Bladder	181	8.6	0.6	112	3.2	0.3
Kidney and Renal Pelvis	132	6.1	0.5	108	3.3	0.3
Ureter	4	0.2	0.1	4	0.1	0.0
Eye and Orbit	2	0.1	0.1	2	0.0	0.0
Brain and Other Nervous System	143	6.5	0.5	153	5.0	0.4
Brain	142	6.4	0.5	151	4.9	0.4
Endocrine System	19	0.8	0.2	20	0.6	0.1
Thyroid	16	0.7	0.2	12	0.3	0.1
Lymphomas	287	13.2	0.8	290	8.6	0.5
Hodgkins Disease	15	0.7	0.2	18	0.6	0.1
Non-Hodgkins Lymphomas	272	12.5	0.8	272	8.0	0.5
Multiple Myeloma	77	3.6	0.4	88	2.6	0.3
Leukemias	227	10.6	0.7	175	5.5	0.4
Acute Lymphocytic Leukemia	17	0.8	0.2	15	0.6	0.1
Chronic Lymphocytic Leukemia	52	2.5	0.4	28	0.8	0.1
Other Lymphocytic Leukemia	11	0.5	0.1	6	0.2	0.1
Acute Myeloid Leukemia	69	3.2	0.4	57	1.9	0.3
Chronic Myeloid Leukemia	14	0.6	0.2	18	0.6	0.1
Monocytic Leukemia	5	0.2	0.1	3	0.1	0.0
Other Leukemia	54	2.5	0.4	46	1.5	0.2
Miscellaneous Malignant Cancer	367	17.0	0.9	399	11.7	0.6

~ Statistic could not be calculated.

Table 12 Total Cancer Deaths and Average Annual Age-adjusted Cancer Mortality Rates (U.S. Year 2000 Standard) Rhode Island, 1996-2000, Blacks by Sex and Anatomical Site

	Males (Blacks)			Females (Blacks)		
SITES	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Malignant Cancers	165	356.8	32.0	160	236.2	19.3
Oral Cavity and Pharynx	2	3.2	2.3	1	1.2	1.2
Lip	0	0.0	~	0	0.0	~
Tongue	1	1.6	1.6	0	0.0	~
Salivary Gland	0	0.0	~	0	0.0	~
Floor of Mouth	0	0.0	~	0	0.0	~
Gum and Other Mouth	0	0.0	~	0	0.0	~
Nasopharynx	0	0.0	~	0	0.0	~
Oropharynx	0	0.0	~	0	0.0	~
Hypopharynx	0	0.0	~	1	1.2	1.2
Digestive System	46	106.8	18.2	43	69.1	10.8
Esophagus	8	16.7	7.1	2	2.7	1.9
Stomach	8	17.2	6.6	4	6.7	3.4
Small Intestine	1	3.5	3.5	0	0.0	~
Colon and Rectum	10	26.3	9.7	20	33.8	7.8
Colon excluding Rectum	9	23.8	9.4	19	31.8	7.5
Rectum and Rectosigmoid Junction	1	2.5	2.5	1	2.0	2.0
Anus, Anal Canal and Anorectum	0	0.0	~	1	1.4	1.4
Liver	5	9.9	4.8	0	0.0	~
Gallbladder	1	5.7	5.7	0	0.0	~
Pancreas	10	17.4	5.6	12	19.3	5.7
Respiratory System	57	117.9	18.3	35	51.5	9.0
Larynx	1	1.3	1.3	1	1.4	1.4
Lung and Bronchus	56	116.6	18.3	34	50.1	8.9
Bones and Joints	0	0.0	~	1	0.8	0.8
Soft Tissue including Heart	1	1.6	1.6	2	2.1	1.5
Skin excluding Basal and Squamous	0	0.0	~	2	2.6	1.8
Melanomas of the Skin	0	0.0	~	2	2.6	1.8
Breast	0	0.0	~	25	34.1	6.9
Female Genital System	0	0.0	~	16	21.3	5.5
Cervix	0	0.0	~	3	3.9	2.4
Corpus	0	0.0	~	4	5.8	3.0
Uterus, NOS	0	0.0	~	1	1.4	1.4
Ovary	0	0.0	~	8	10.2	3.7
Male Genital System	25	71.3	15.5	0	0.0	~
Prostate	25	71.3	15.5	0	0.0	~
Testis	0	0.0	~	0	0.0	~
Penis	0	0.0	~	0	0.0	~
Urinary System	3	6.9	4.0	1	2.2	2.2
Urinary Bladder	1	2.5	2.5	1	2.2	2.2
Kidney and Renal Pelvis	2	4.5	3.2	0	0.0	~
Ureter	0	0.0	~	0	0.0	~
Eye and Orbit	0	0.0	~	0	0.0	~
Brain and Other Nervous System	2	2.0	1.5	2	3.2	2.3
Brain	2	2.0	1.5	2	3.2	2.3
Endocrine System	0	0.0	~	2	2.9	2.1
Thyroid	0	0.0	~	2	2.9	2.1
Lymphomas	7	7.7	3.0	7	9.9	3.9
Hodgkins Disease	1	1.3	1.3	1	1.4	1.4
Non-Hodgkins Lymphomas	6	6.4	2.7	6	8.5	3.6
Multiple Myeloma	1	1.6	1.6	7	10.1	3.9
Leukemias	8	12.7	5.2	6	9.5	4.1
Acute Lymphocytic Leukemia	1	0.9	0.9	1	0.9	0.9
Chronic Lymphocytic Leukemia	2	4.1	3.0	0	0.0	~
Other Lymphocytic Leukemia	0	0.0	~	0	0.0	~
Acute Myeloid Leukemia	2	1.9	1.3	1	1.7	1.7
Chronic Myeloid Leukemia	2	2.3	1.8	0	0.0	~
Monocytic Leukemia	0	0.0	~	0	0.0	~
Other Leukemia	1	3.5	3.5	4	7.0	3.7
Miscellaneous Malignant Cancer	13	24.9	7.2	10	15.8	5.2

~ Statistic could not be calculated.

Table 13 Total Cancer Deaths and Average Annual Age-adjusted Cancer Mortality Rates (U.S. Year 1970 Standard) Rhode Island, 1996-2000, All Races by Sex and Anatomical Site

	Males (All Races)			Females (All Races)		
SITES	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Malignant Cancers	6,188	207.8	2.7	6,171	142.7	2.0
Oral Cavity and Pharynx	79	2.7	0.3	64	1.4	0.2
Lip	0	0.0	~	0	0.0	~
Tongue	23	0.8	0.2	16	0.3	0.1
Salivary Gland	2	0.1	0.0	10	0.2	0.1
Floor of Mouth	1	0.0	0.0	2	0.0	0.0
Gum and Other Mouth	13	0.4	0.1	11	0.2	0.1
Nasopharynx	4	0.2	0.1	7	0.1	0.1
Oropharynx	10	0.3	0.1	3	0.1	0.0
Hypopharynx	4	0.1	0.1	2	0.1	0.1
Digestive System	1,615	54.5	1.4	1,522	31.3	0.9
Esophagus	194	6.8	0.5	76	1.6	0.2
Stomach	215	7.1	0.5	153	3.1	0.3
Small Intestine	7	0.2	0.1	15	0.3	0.1
Colon and Rectum	648	21.6	0.9	747	14.7	0.6
Colon excluding Rectum	537	17.7	0.8	648	12.8	0.6
Rectum and Rectosigmoid Junction	111	3.9	0.4	99	2.0	0.2
Anus, Anal Canal and Anorectum	5	0.2	0.1	4	0.1	0.1
Liver	137	4.8	0.4	57	1.2	0.2
Gallbladder	20	0.6	0.1	31	0.7	0.1
Pancreas	328	11.4	0.6	347	7.4	0.4
Respiratory System	2,120	72.5	1.6	1,534	38.4	1.1
Larynx	88	3.1	0.3	23	0.6	0.1
Lung and Bronchus	2,016	68.9	1.6	1,500	37.6	1.0
Bones and Joints	9	0.3	0.1	11	0.4	0.1
Soft Tissue including Heart	50	1.7	0.2	47	1.2	0.2
Skin excluding Basal and Squamous	115	3.9	0.4	107	2.4	0.3
Melanomas of the Skin	75	2.6	0.3	82	2.0	0.2
Breast	6	0.2	0.1	970	23.4	0.8
Female Genital System	0	0.0	~	519	13.1	0.6
Cervix	0	0.0	~	84	2.3	0.3
Corpus	0	0.0	~	66	1.7	0.2
Uterus, NOS	0	0.0	~	53	1.2	0.2
Ovary	0	0.0	~	287	7.2	0.5
Male Genital System	714	22.1	0.8	0	0.0	~
Prostate	702	21.7	0.8	0	0.0	~
Testis	9	0.3	0.1	0	0.0	~
Penis	1	0.0	0.0	0	0.0	~
Urinary System	325	10.6	0.6	233	5.0	0.4
Urinary Bladder	182	5.8	0.4	115	2.3	0.2
Kidney and Renal Pelvis	136	4.6	0.4	109	2.5	0.3
Ureter	4	0.1	0.1	4	0.1	0.0
Eye and Orbit	2	0.1	0.1	2	0.0	0.0
Brain and Other Nervous System	145	5.1	0.4	155	3.9	0.3
Brain	144	5.0	0.4	153	3.9	0.3
Endocrine System	19	0.7	0.2	22	0.5	0.1
Thyroid	16	0.5	0.1	14	0.3	0.1
Lymphomas	294	10.0	0.6	297	6.4	0.4
Hodgkins Disease	16	0.5	0.1	19	0.4	0.1
Non-Hodgkins Lymphomas	278	9.4	0.6	278	6.0	0.4
Multiple Myeloma	79	2.6	0.3	97	2.2	0.2
Leukemias	235	7.9	0.5	181	4.3	0.4
Acute Lymphocytic Leukemia	18	0.6	0.2	16	0.5	0.1
Chronic Lymphocytic Leukemia	54	1.7	0.2	28	0.5	0.1
Other Lymphocytic Leukemia	11	0.4	0.1	6	0.2	0.1
Acute Myeloid Leukemia	71	2.5	0.3	58	1.4	0.2
Chronic Myeloid Leukemia	16	0.5	0.1	18	0.5	0.1
Monocytic Leukemia	5	0.1	0.1	3	0.0	0.0
Other Leukemia	55	1.9	0.3	50	1.2	0.2
Miscellaneous Malignant Cancer	381	12.8	0.7	410	8.8	0.5
Unknown/missing/invalid COD	0	0.0	~	0	0.0	~

~ Statistic could not be calculated.

Table 14 Total Cancer Deaths and Average Annual Age-adjusted Cancer Mortality Rates (U.S. Year 1970 Standard) Rhode Island, 1996-2000, Whites by Sex and Anatomical Site

	Males (Whites)			Females (Whites)		
SITES	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Malignant Cancers	6,009	213.8	2.8	5,998	147.4	2.1
Oral Cavity and Pharynx	77	2.8	0.3	62	1.4	0.2
Lip	0	0.0	~	0	0.0	~
Tongue	22	0.8	0.2	16	0.3	0.1
Salivary Gland	2	0.1	0.0	10	0.2	0.1
Floor of Mouth	1	0.0	0.0	2	0.0	0.0
Gum and Other Mouth	13	0.5	0.1	10	0.2	0.1
Nasopharynx	4	0.2	0.1	7	0.1	0.1
Oropharynx	10	0.4	0.1	3	0.1	0.1
Hypopharynx	4	0.2	0.1	1	0.0	0.0
Digestive System	1,566	56.0	1.4	1,477	32.1	0.9
Esophagus	186	6.9	0.5	74	1.7	0.2
Stomach	207	7.2	0.5	149	3.2	0.3
Small Intestine	6	0.2	0.1	15	0.4	0.1
Colon and Rectum	636	22.4	0.9	726	15.1	0.6
Colon excluding Rectum	526	18.3	0.8	629	13.0	0.6
Rectum and Rectosigmoid Junction	110	4.1	0.4	97	2.0	0.2
Anus, Anal Canal and Anorectum	5	0.2	0.1	3	0.1	0.1
Liver	132	4.9	0.4	57	1.3	0.2
Gallbladder	19	0.6	0.1	31	0.8	0.2
Pancreas	317	11.7	0.7	335	7.6	0.5
Respiratory System	2,057	74.4	1.7	1,496	39.9	1.1
Larynx	87	3.3	0.4	22	0.6	0.1
Lung and Bronchus	1,954	70.6	1.6	1,463	39.0	1.1
Bones and Joints	9	0.4	0.1	10	0.4	0.1
Soft Tissue including Heart	49	1.8	0.3	45	1.2	0.2
Skin excluding Basal and Squamous	115	4.1	0.4	105	2.5	0.3
Melanomas of the Skin	75	2.7	0.3	80	2.1	0.3
Breast	6	0.2	0.1	944	24.3	0.9
Female Genital System	0	0.0	~	503	13.5	0.7
Cervix	0	0.0	~	81	2.5	0.3
Corpus	0	0.0	~	62	1.7	0.2
Uterus, NOS	0	0.0	~	52	1.3	0.2
Ovary	0	0.0	~	279	7.4	0.5
Male Genital System	688	22.3	0.9	0	0.0	~
Prostate	676	21.9	0.9	0	0.0	~
Testis	9	0.4	0.1	0	0.0	~
Penis	1	0.0	0.0	0	0.0	~
Urinary System	320	11.1	0.6	229	5.2	0.4
Urinary Bladder	181	6.1	0.5	112	2.4	0.3
Kidney and Renal Pelvis	132	4.7	0.4	108	2.7	0.3
Ureter	4	0.1	0.1	4	0.1	0.0
Eye and Orbit	2	0.1	0.1	2	0.0	0.0
Brain and Other Nervous System	143	5.4	0.5	153	4.2	0.4
Brain	142	5.4	0.5	151	4.2	0.4
Endocrine System	19	0.7	0.2	20	0.5	0.1
Thyroid	16	0.6	0.1	12	0.3	0.1
Lymphomas	287	10.4	0.6	290	6.6	0.4
Hodgkins Disease	15	0.6	0.1	18	0.4	0.1
Non-Hodgkins Lymphomas	272	9.8	0.6	272	6.2	0.4
Multiple Myeloma	77	2.6	0.3	88	2.1	0.2
Leukemias	227	8.2	0.6	175	4.6	0.4
Acute Lymphocytic Leukemia	17	0.7	0.2	15	0.6	0.2
Chronic Lymphocytic Leukemia	52	1.7	0.2	28	0.6	0.1
Other Lymphocytic Leukemia	11	0.4	0.1	6	0.2	0.1
Acute Myeloid Leukemia	69	2.7	0.3	57	1.5	0.2
Chronic Myeloid Leukemia	14	0.5	0.1	18	0.5	0.1
Monocytic Leukemia	5	0.2	0.1	3	0.0	0.0
Other Leukemia	54	1.9	0.3	46	1.2	0.2
Miscellaneous Malignant Cancer	367	13.1	0.7	399	9.0	0.5
Unknown/missing/invalid COD	0	0.0	~	0	0.0	~

~ Statistic could not be calculated.

Table 15 Total Cancer Deaths and Average Annual Age-adjusted Cancer Mortality Rates (U.S. Year 1970 Standard) Rhode Island, 1996-2000, Blacks by Sex and Anatomical Site

	Males (Blacks)			Females (Blacks)		
SITES	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Malignant Cancers	165	268.8	21.9	160	186.0	14.9
Oral Cavity and Pharynx	2	3.2	2.3	1	1.3	1.3
Lip	0	0.0	~	0	0.0	~
Tongue	1	1.6	1.6	0	0.0	~
Salivary Gland	0	0.0	~	0	0.0	~
Floor of Mouth	0	0.0	~	0	0.0	~
Gum and Other Mouth	0	0.0	~	0	0.0	~
Nasopharynx	0	0.0	~	0	0.0	~
Oropharynx	0	0.0	~	0	0.0	~
Hypopharynx	0	0.0	~	1	1.3	1.3
Digestive System	46	78.7	12.1	43	49.8	7.6
Esophagus	8	12.8	4.8	2	2.4	1.7
Stomach	8	12.8	4.7	4	4.6	2.3
Small Intestine	1	2.2	2.2	0	0.0	~
Colon and Rectum	10	18.0	5.9	20	23.5	5.3
Colon excluding Rectum	9	16.3	5.7	19	22.2	5.1
Rectum and Rectosigmoid Junction	1	1.7	1.7	1	1.3	1.3
Anus, Anal Canal and Anorectum	0	0.0	~	1	1.2	1.2
Liver	5	8.3	3.8	0	0.0	~
Gallbladder	1	2.7	2.7	0	0.0	~
Pancreas	10	15.7	5.0	12	13.7	4.0
Respiratory System	57	90.7	12.6	35	42.5	7.2
Larynx	1	1.1	1.1	1	1.2	1.2
Lung and Bronchus	56	89.6	12.6	34	41.3	7.1
Bones and Joints	0	0.0	~	1	0.6	0.6
Soft Tissue including Heart	1	1.6	1.6	2	1.9	1.4
Skin excluding Basal and Squamous	0	0.0	~	2	2.5	1.8
Melanomas of the Skin	0	0.0	~	2	2.5	1.8
Breast	0	0.0	~	25	29.1	5.9
Female Genital System	0	0.0	~	16	18.9	4.8
Cervix	0	0.0	~	3	3.3	2.0
Corpus	0	0.0	~	4	4.9	2.4
Uterus, NOS	0	0.0	~	1	1.4	1.4
Ovary	0	0.0	~	8	9.3	3.3
Male Genital System	25	48.0	9.8	0	0.0	~
Prostate	25	48.0	9.8	0	0.0	~
Testis	0	0.0	~	0	0.0	~
Penis	0	0.0	~	0	0.0	~
Urinary System	3	5.1	3.0	1	1.0	1.0
Urinary Bladder	1	1.7	1.7	1	1.0	1.0
Kidney and Renal Pelvis	2	3.4	2.4	0	0.0	~
Ureter	0	0.0	~	0	0.0	~
Eye and Orbit	0	0.0	~	0	0.0	~
Brain and Other Nervous System	2	1.7	1.3	2	2.6	1.8
Brain	2	1.7	1.3	2	2.6	1.8
Endocrine System	0	0.0	~	2	2.5	1.8
Thyroid	0	0.0	~	2	2.5	1.8
Lymphomas	7	6.9	2.8	7	8.0	3.1
Hodgkins Disease	1	1.1	1.1	1	1.4	1.4
Non-Hodgkins Lymphomas	6	5.7	2.5	6	6.6	2.7
Multiple Myeloma	1	1.6	1.6	7	8.0	3.0
Leukemias	8	9.7	3.8	6	6.0	2.5
Acute Lymphocytic Leukemia	1	0.6	0.6	1	0.6	0.6
Chronic Lymphocytic Leukemia	2	3.4	2.4	0	0.0	~
Other Lymphocytic Leukemia	0	0.0	~	0	0.0	~
Acute Myeloid Leukemia	2	1.3	0.9	1	1.2	1.2
Chronic Myeloid Leukemia	2	2.2	1.7	0	0.0	~
Monocytic Leukemia	0	0.0	~	0	0.0	~
Other Leukemia	1	2.2	2.2	4	4.2	2.2
Miscellaneous Malignant Cancer	13	21.5	6.0	10	11.4	3.6
Unknown/missing/invalid COD	0	0.0	~	0	0.0	~

~ Statistic could not be calculated.

Table 16 Total Cancer Deaths and Average Annual Age-adjusted Cancer Mortality Rates (U.S. Year 2000 Standard) Rhode Island Counties, 1996-2000, All Races by Sex and Selected Anatomical Site

	Males (All Races)			Females (All Races)		
Counties / Sites	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Counties						
All Malignant Cancers	6,188	270.7	3.5	6,171	179.0	2.3
Colon and Rectum	648	28.9	1.2	747	20.1	0.8
Lung and Bronchus	2,016	85.9	1.9	1,500	45.0	1.2
Melanomas of the Skin	75	3.3	0.4	82	2.5	0.3
Breast	6	0.3	0.1	970	29.2	1.0
Cervix	0	0.0	~	84	2.8	0.3
Prostate	702	33.1	1.3	0	0.0	~
Bristol County						
All Malignant Cancers	347	268.9	14.7	283	155.4	9.4
Colon and Rectum	31	24.1	4.4	38	19.2	3.2
Lung and Bronchus	116	87.1	8.2	63	35.8	4.6
Melanomas of the Skin	3	2.4	1.4	6	3.3	1.4
Breast	0	0.0	~	45	26.2	4.0
Cervix	0	0.0	~	5	3.6	1.6
Prostate	41	34.9	5.6	0	0.0	~
Kent County						
All Malignant Cancers	1,083	285.8	8.9	1,126	200.9	6.1
Colon and Rectum	128	34.3	3.1	134	23.0	2.0
Lung and Bronchus	363	91.6	4.9	287	51.7	3.1
Melanomas of the Skin	21	5.5	1.2	15	2.9	0.8
Breast	1	0.2	0.2	184	33.6	2.5
Cervix	0	0.0	~	16	3.1	0.8
Prostate	121	35.8	3.4	0	0.0	~
Newport County						
All Malignant Cancers	479	252.1	11.7	490	177.9	8.1
Colon and Rectum	45	23.3	3.5	57	19.5	2.6
Lung and Bronchus	140	72.1	6.2	118	44.1	4.1
Melanomas of the Skin	4	1.9	1.0	7	2.4	0.9
Breast	0	0.0	~	78	29.0	3.3
Cervix	0	0.0	~	9	3.7	1.2
Prostate	64	37.3	4.8	0	0.0	~
Providence County						
All Malignant Cancers	3,634	271.9	4.5	3,681	176.8	3.0
Colon and Rectum	386	29.4	1.5	448	19.4	0.9
Lung and Bronchus	1,181	86.8	2.5	867	43.6	1.5
Melanomas of the Skin	42	3.2	0.5	43	2.2	0.4
Breast	5	0.4	0.2	583	29.4	1.3
Cervix	0	0.0	~	46	2.7	0.4
Prostate	403	31.8	1.6	0	0.0	~
Washington County						
All Malignant Cancers	645	258.1	10.4	591	170.1	7.0
Colon and Rectum	58	24.3	3.3	70	19.6	2.3
Lung and Bronchus	216	81.5	5.6	165	48.5	3.8
Melanomas of the Skin	5	2.5	1.2	11	3.3	1.0
Breast	0	0.0	~	80	23.2	2.6
Cervix	0	0.0	~	8	2.4	0.9
Prostate	73	32.7	3.9	0	0.0	~

~ Statistic could not be calculated.

Table 17 Total Cancer Deaths and Average Annual Age-adjusted Cancer Mortality Rates (U.S. Year 1970 Standard) Rhode Island Counties, 1996-2000, All Races by Sex and Selected Anatomical Site

	Males (All Races)			Females (All Races)		
Counties / Sites	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Counties						
All Malignant Cancers	6,188	207.8	2.7	6,171	142.7	2.0
Colon and Rectum	648	21.6	0.9	747	14.7	0.6
Lung and Bronchus	2,016	68.9	1.6	1,500	37.6	1.0
Melanomas of the Skin	75	2.6	0.3	82	2.0	0.2
Breast	6	0.2	0.1	970	23.4	0.8
Cervix	0	0.0	~	84	2.3	0.3
Prostate	702	21.7	0.8	0	0.0	~
Bristol County						
All Malignant Cancers	347	203.4	11.1	283	122.9	8.0
Colon and Rectum	31	16.9	3.1	38	13.8	2.5
Lung and Bronchus	116	69.0	6.5	63	30.1	4.1
Melanomas of the Skin	3	2.2	1.3	6	2.8	1.3
Breast	0	0.0	~	45	21.6	3.4
Cervix	0	0.0	~	5	2.9	1.4
Prostate	41	21.5	3.4	0	0.0	~
Kent County						
All Malignant Cancers	1,083	220.5	6.8	1,126	161.8	5.2
Colon and Rectum	128	26.3	2.3	134	17.6	1.6
Lung and Bronchus	363	74.3	3.9	287	43.2	2.7
Melanomas of the Skin	21	4.4	1.0	15	2.2	0.6
Breast	1	0.2	0.2	184	26.9	2.1
Cervix	0	0.0	~	16	2.6	0.7
Prostate	121	23.7	2.2	0	0.0	~
Newport County						
All Malignant Cancers	479	191.8	8.8	490	141.9	6.9
Colon and Rectum	45	18.0	2.7	57	14.3	2.1
Lung and Bronchus	140	57.1	4.9	118	37.1	3.6
Melanomas of the Skin	4	1.6	0.8	7	1.6	0.7
Breast	0	0.0	~	78	23.9	2.9
Cervix	0	0.0	~	9	2.9	1.0
Prostate	64	24.6	3.1	0	0.0	~
Providence County						
All Malignant Cancers	3,634	209.3	3.5	3,681	140.4	2.6
Colon and Rectum	386	21.9	1.1	448	13.9	0.7
Lung and Bronchus	1,181	69.2	2.1	867	36.3	1.3
Melanomas of the Skin	42	2.5	0.4	43	1.8	0.3
Breast	5	0.3	0.1	583	23.5	1.1
Cervix	0	0.0	~	46	2.3	0.4
Prostate	403	20.9	1.1	0	0.0	~
Washington County						
All Malignant Cancers	645	196.0	7.8	591	137.1	5.9
Colon and Rectum	58	17.4	2.3	70	14.7	1.9
Lung and Bronchus	216	67.3	4.6	165	41.2	3.3
Melanomas of the Skin	5	1.4	0.6	11	2.9	0.9
Breast	0	0.0	~	80	18.6	2.2
Cervix	0	0.0	~	8	2.0	0.7
Prostate	73	21.3	2.5	0	0.0	~

~ Statistic could not be calculated.

APPENDIX: RHODE ISLAND CANCER RATES, 1998-2002
PROVISIONAL DETAILED TABLES of CANCER INCIDENCE RATES

Introduction

The Rhode Island Cancer Registry maintains up-to-date cancer statistics for the State, including incidence rates, prevalence estimates, and mortality rates. The statistics are computed for the State as a whole and for counties. These latest **provisional incidence statistics** for the years **1998-2002**, were prepared in February, 2004.

Sources of Data

Age-adjusted incidence rates by sex and by race are computed from:

- case reports of newly diagnosed cancers made to the Rhode Island Cancer Registry
- counts of the Rhode Island population in the censuses of 1980, 1990, and 2000

Methods

Incidence rates and corresponding standard errors are calculated using SEERStat, software produced for public use by the Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute. The algorithms for rates, as described in SEERStat documentation, are as follows:

Crude Rate

A crude rate is the number of cases per 100,000 in a given population.

$$cruderate = \frac{count}{population} \times 100{,}000$$

Age-adjusted Rate

An age-adjusted rate is a weighted average of crude rates, where the crude rates are calculated for different age groups and the weights are the proportions of persons in the corresponding age groups of a standard population. Several sets of standard populations are included in SEER*Stat. These include the total U.S. populations (1940, 1950, 1960, 1970, 1980, and 1990), an estimate of the U.S. 2000 population, 1991 Canadian population, and the world population. The age-adjusted rate for an age group comprised of the ages x through y is calculated using the following formula:

$$aarate_{x-y} = \sum_{i=x}^{y} \left[\left(\frac{count_i}{pop_i} \right) \times 100{,}000 \times \left(\frac{stdmil_i}{\sum_{j=x}^{y} stdmil_j} \right) \right]$$

where count is the number of cases for the ith age group, pop_i is the relevant population for the same age group, and $stdmil_i$ is the standard population for the same age group.

Standard Error for a Crude Rate

This calculation assumes that the cancer counts have Poisson distributions.

$$SE_{crude} = \frac{\sqrt{count}}{population} \times 100{,}000$$

Standard Error for an Age-adjusted Rate

This calculation assumes that the cancer counts have Poisson distributions. Suppose that the age-adjusted rate is comprised of age groups x through y.

$$SE_{AArate} = \left[\sum_{i=x}^{y} \left(\frac{stdmil_i}{\sum_{j=x}^{y} stdmil_j} \right)^2 \times \left(\frac{count_i}{population_i^2} \right) \right]^{1/2} \times 100{,}000$$

Crude Rate Confidence Intervals

The endpoints of a p x 100% confidence interval are calculated as:

$$CI_{low} = \frac{\left(\frac{1}{2} \left(ChiInv\left(\frac{p}{2}, 2 \times count \right) \right) \right)}{population} \times 100{,}000$$

$$CI_{high} = \frac{\left(\frac{1}{2} \left(ChiInv\left(1 - \frac{p}{2}, 2 \times (count + 1) \right) \right) \right)}{population} \times 100{,}000$$

where Chi Inv(p,n) is the inverse of the chi-squared distribution function evaluated at p and with n degrees of freedom, and we define Chi Inv (p,0) = 0.

Although the normal approximation may be used with the standard errors to obtain confidence intervals when the count is large, we use the above exact method that holds even with small counts (see Johnson and Kotz, 1969, or Fay and Feuer, 1997). When the count is large the 2 methods produce similar results.

Age-adjusted Rate Confidence Intervals

Suppose that the age-adjusted rate is comprised of age groups x through y, and let:

$$w_i = \frac{stdmil_i}{\left(pop_i \times \sum_{j=x}^{y} stdmil_j \right)}$$

$$w_m = \max\left(w_i \right)$$

$$v = \sum_{i=x}^{y} \left(w_i^2 \times count_i \right)$$

The endpoints of a p x 100% confidence interval are calculated as:

$$CI_{low} = \left(\frac{v}{2 \times rate}\right) \times \left(ChiInv\left(\frac{p}{2}, \frac{\left(2 \times rate^2\right)}{v}\right)\right) \times 100{,}000$$

$$CI_{high} = \left(\frac{v + w_m^2}{2\left(rate + w_m\right)}\right) \times \left(ChiInv\left(1 - \frac{p}{2}, \frac{2\left(rate + w_m\right)^2}{\left(v + w_m^2\right)}\right)\right) \times 100{,}000$$

This method for calculating the confidence interval was developed in Fay and Feuer (1997). The method produces similar confidence limits to the standard normal approximation when the counts are large and the population being studied is similar to the standard population. In other cases, the above method is more likely to ensure proper coverage.

Note

"Rate" used in the above formulas is not per 100,000 population.

Source

SEERStat Version 5.1.14, January 14, 2004.

List of Tables

Table 1 Total Cancer Cases and Average Annual Age-adjusted Cancer Incidence Rates (U.S. Year 2000 Standard) Rhode Island, 1998-2002, All Races, by Sex and Anatomical Site

	Males (All Races)			Females (All Races)		
SITES	Count	Rate	SE	Count	Rate	SE
All Sites	15,119	628.9	5.1	14,315	444.5	3.8
Oral Cavity and Pharynx	367	15.0	0.8	188	5.9	0.4
Lip	28	1.3	0.2	17	0.5	0.1
Tongue	103	4.2	0.4	54	1.8	0.2
Salivary Gland	29	1.2	0.2	33	1.0	0.2
Floor of Mouth	29	1.2	0.2	17	0.5	0.1
Gum and Other Mouth	46	1.9	0.3	27	0.8	0.2
Nasopharynx	19	0.8	0.2	5	0.2	0.1
Oropharynx	23	0.9	0.2	10	0.4	0.1
Hypopharynx	45	1.9	0.3	11	0.4	0.1
Digestive System	3010	126.4	2.3	2935	83.5	1.6
Esophagus	236	9.8	0.6	78	2.2	0.3
Stomach	317	13.4	0.8	239	6.5	0.4
Small Intestine	55	2.3	0.3	59	1.8	0.2
Colon and Rectum	1789	75.3	1.8	1858	52.6	1.3
Colon excluding Rectum	1237	52.4	1.5	1413	39.8	1.1
Rectum and Rectosigmoid Junction	552	22.9	1.0	445	12.8	0.6
Anus, Anal Canal and Anorectum	29	1.2	0.2	52	1.6	0.2
Liver	160	6.5	0.5	67	2.0	0.2
Intrahepatic Bile Duct	28	1.2	0.2	26	0.8	0.2
Gallbladder	26	1.2	0.2	50	1.5	0.2
Pancreas	296	12.5	0.7	373	10.5	0.6
Respiratory System	2701	112.0	2.2	2063	63.7	1.4
Larynx	201	8.4	0.6	57	1.7	0.2
Lung and Bronchus	2417	100.1	2.0	1972	60.9	1.4
Bones and Joints	17	0.7	0.2	14	0.5	0.1
Soft Tissue including Heart	106	4.4	0.4	79	2.7	0.3
Skin excluding Basal and Squamous	734	30.4	1.1	520	17.1	0.8
Melanoma of the Skin	660	27.3	1.1	462	15.3	0.7
Breast	27	1.2	0.2	4054	130.6	2.1
Female Genital System	0	0.0	~	1570	51.1	1.3
Cervix Uteri	0	0.0	~	206	7.3	0.5
Corpus and Uterus, NOS	0	0.0	~	807	26.0	0.9
Ovary	0	0.0	~	406	13.2	0.7
Male Genital System	4441	183.8	2.8	0	0.0	~
Prostate	4263	176.8	2.7	0	0.0	~
Testis	148	5.8	0.5	0	0.0	~
Penis	23	0.9	0.2	0	0.0	~
Urinary System	1794	75.1	1.8	830	25.1	0.9
Urinary Bladder	1249	52.7	1.5	482	14.3	0.7
Kidney and Renal Pelvis	508	20.8	0.9	328	10.3	0.6
Ureter	22	0.9	0.2	16	0.4	0.1
Eye and Orbit	18	0.7	0.2	19	0.7	0.2
Brain and Other Nervous System	193	7.8	0.6	176	5.8	0.4
Brain	186	7.5	0.6	163	5.3	0.4
Endocrine System	126	5.0	0.4	385	13.8	0.7
Thyroid	113	4.5	0.4	367	13.2	0.7
Lymphoma	650	26.7	1.1	633	19.5	0.8
Hodgkin Lymphoma	89	3.5	0.4	76	2.7	0.3
Non-Hodgkin Lymphoma	561	23.2	1.0	557	16.8	0.7
Myeloma	152	6.5	0.5	157	4.6	0.4
Leukemia	393	16.4	0.8	298	9.2	0.5
Acute Lymphocytic Leukemia	53	2.2	0.3	35	1.4	0.2
Chronic Lymphocytic Leukemia	120	5.0	0.5	81	2.3	0.3
Acute Myeloid Leukemia	123	5.1	0.5	96	3.0	0.3
Acute Monocytic Leukemia	6	0.2	0.1	3	0.1	0.1
Chronic Myeloid Leukemia	48	2.0	0.3	43	1.3	0.2
Miscellaneous	390	16.7	0.9	394	10.9	0.6

~ Statistic could not be calculated.

Table 2 Total Cancer Cases and Average Annual Age-adjusted Cancer Incidence Rates (U.S. Year 2000 Standard) Rhode Island, 1998-2002, Whites, by Sex and Anatomical Site

SITES	Males (Whites)			Females (Whites)		
	Count	Rate	SE	Count	Rate	SE
All Sites	14613	652.9	5.4	13866	467.1	4.1
Oral Cavity and Pharynx	354	15.7	0.8	177	6.1	0.5
Lip	28	1.3	0.3	17	0.6	0.1
Tongue	102	4.5	0.4	51	1.8	0.3
Salivary Gland	27	1.2	0.2	32	1.0	0.2
Floor of Mouth	25	1.1	0.2	15	0.5	0.1
Gum and Other Mouth	44	2.0	0.3	27	0.9	0.2
Nasopharynx	18	0.8	0.2	5	0.2	0.1
Oropharynx	23	1.0	0.2	9	0.4	0.1
Hypopharynx	43	1.9	0.3	9	0.3	0.1
Digestive System	2906	130.5	2.4	2845	86.2	1.7
Esophagus	230	10.3	0.7	75	2.3	0.3
Stomach	301	13.6	0.8	224	6.5	0.5
Small Intestine	52	2.3	0.3	58	1.9	0.3
Colon and Rectum	1746	78.5	1.9	1809	54.6	1.3
Colon excluding Rectum	1206	54.4	1.6	1380	41.4	1.1
Rectum and Rectosigmoid Junction	540	24.0	1.0	429	13.2	0.7
Anus, Anal Canal and Anorectum	28	1.3	0.2	51	1.7	0.2
Liver	147	6.5	0.5	64	2.0	0.3
Intrahepatic Bile Duct	26	1.1	0.2	26	0.8	0.2
Gallbladder	23	1.1	0.2	48	1.6	0.2
Pancreas	286	12.9	0.8	359	10.7	0.6
Respiratory System	2608	115.6	2.3	1995	66.2	1.5
Larynx	187	8.4	0.6	54	1.7	0.2
Lung and Bronchus	2339	103.5	2.1	1908	63.4	1.5
Bones and Joints	15	0.7	0.2	12	0.5	0.1
Soft Tissue including Heart	104	4.8	0.5	74	2.8	0.3
Skin excluding Basal and Squamous	724	32.5	1.2	515	18.7	0.8
Melanoma of the Skin	656	29.4	1.2	458	16.8	0.8
Breast	24	1.1	0.2	3922	137.4	2.2
Female Genital System	0	0.0	~	1527	54.3	1.4
Cervix Uteri	0	0.0	~	196	7.9	0.6
Corpus and Uterus, NOS	0	0.0	~	790	27.7	1.0
Ovary	0	0.0	~	392	13.9	0.7
Male Genital System	4277	189.7	2.9	0	0.0	~
Prostate	4106	181.9	2.8	0	0.0	~
Testis	144	6.6	0.6	0	0.0	~
Penis	21	0.9	0.2	0	0.0	~
Urinary System	1755	78.5	1.9	811	26.4	1.0
Urinary Bladder	1227	55.2	1.6	477	15.2	0.7
Kidney and Renal Pelvis	492	21.7	1.0	314	10.7	0.6
Ureter	21	1.0	0.2	16	0.4	0.1
Eye and Orbit	17	0.7	0.2	19	0.7	0.2
Brain and Other Nervous System	190	8.5	0.6	172	6.3	0.5
Brain	183	8.2	0.6	159	5.8	0.5
Endocrine System	120	5.4	0.5	359	14.7	0.8
Thyroid	108	4.8	0.5	342	14.1	0.8
Lymphoma	615	27.7	1.1	616	20.8	0.9
Hodgkin Lymphoma	84	3.9	0.4	71	2.9	0.4
Non-Hodgkin Lymphoma	531	23.8	1.0	545	17.8	0.8
Myeloma	145	6.6	0.6	148	4.7	0.4
Leukemia	383	17.6	0.9	291	10.0	0.6
Acute Lymphocytic Leukemia	51	2.6	0.4	33	1.6	0.3
Chronic Lymphocytic Leukemia	118	5.3	0.5	81	2.4	0.3
Acute Myeloid Leukemia	119	5.4	0.5	91	3.1	0.3
Acute Monocytic Leukemia	6	0.3	0.1	3	0.1	0.1
Chronic Myeloid Leukemia	47	2.1	0.3	43	1.4	0.2
Miscellaneous	376	17.2	0.9	383	11.2	0.6

~ Statistic could not be calculated.

Table 3 Total Cancer Cases and Average Annual Age-adjusted Cancer Incidence Rates (U.S. Year 2000 Standard) Rhode Island, 1998-2002, Blacks, by Sex and Anatomical Site

SITES	Males (Blacks)			Females (Blacks)		
	Count	Rate	SE	Count	Rate	SE
All Sites	385	662.6	38.0	322	417.0	24.1
Oral Cavity and Pharynx	10	13.0	4.2	7	9.4	3.7
Lip	0	0.0	~	0	0.0	~
Tongue	1	1.2	1.2	2	2.2	1.6
Salivary Gland	0	0.0	~	1	2.1	2.1
Floor of Mouth	4	5.3	2.7	0	0.0	~
Gum and Other Mouth	2	2.8	2.1	0	0.0	~
Nasopharynx	1	1.0	1.0	0	0.0	~
Oropharynx	0	0.0	~	0	0.0	~
Hypopharynx	1	1.2	1.2	2	2.4	1.7
Digestive System	64	120.7	16.9	67	95.6	12.0
Esophagus	5	6.9	3.2	3	4.2	2.5
Stomach	9	15.3	5.2	14	18.9	5.2
Small Intestine	2	5.4	3.9	1	1.2	1.2
Colon and Rectum	26	53.9	11.8	35	51.2	8.9
Colon excluding Rectum	19	40.0	10.5	26	36.4	7.3
Rectum and Rectosigmoid Junction	7	13.8	5.4	9	14.8	5.1
Anus, Anal Canal and Anorectum	1	0.8	0.8	0	0.0	~
Liver	5	8.0	3.6	0	0.0	~
Intrahepatic Bile Duct	1	1.9	1.9	0	0.0	~
Gallbladder	2	9.3	6.9	1	1.2	1.2
Pancreas	9	13.1	4.4	12	17.0	5.1
Respiratory System	77	138.3	17.6	61	82.0	10.7
Larynx	11	19.0	6.2	3	4.1	2.3
Lung and Bronchus	66	119.3	16.5	57	76.6	10.4
Bones and Joints	1	0.9	0.9	1	0.8	0.8
Soft Tissue including Heart	1	1.2	1.2	3	2.8	1.7
Skin excluding Basal and Squamous	6	4.9	2.0	2	2.4	1.7
Melanoma of the Skin	0	0.0	~	1	1.2	1.2
Breast	3	5.6	3.2	92	115.7	12.4
Female Genital System	0	0.0	~	28	34.4	6.8
Cervix Uteri	0	0.0	~	5	4.8	2.2
Corpus and Uterus, NOS	0	0.0	~	14	19.2	5.2
Ovary	0	0.0	~	7	7.9	3.1
Male Genital System	144	259.8	24.1	0	0.0	~
Prostate	139	252.5	23.7	0	0.0	~
Testis	2	1.3	0.9	0	0.0	~
Penis	2	5.0	3.7	0	0.0	~
Urinary System	27	40.9	8.5	15	19.1	5.1
Urinary Bladder	13	21.7	6.7	5	7.6	3.5
Kidney and Renal Pelvis	14	19.2	5.3	10	11.5	3.7
Ureter	0	0.0	~	0	0.0	~
Eye and Orbit	0	0.0	~	0	0.0	~
Brain and Other Nervous System	3	2.5	1.4	3	4.5	2.7
Brain	3	2.5	1.4	3	4.5	2.7
Endocrine System	3	2.5	1.4	15	14.4	3.8
Thyroid	3	2.5	1.4	14	13.2	3.6
Lymphoma	23	27.9	6.2	10	10.5	3.5
Hodgkin Lymphoma	4	3.1	1.6	4	3.6	1.8
Non-Hodgkin Lymphoma	19	24.8	6.0	6	6.9	3.0
Myeloma	5	9.7	4.6	7	10.9	4.2
Leukemia	7	9.4	3.8	3	3.4	2.3
Acute Lymphocytic Leukemia	1	1.9	1.9	1	0.7	0.7
Chronic Lymphocytic Leukemia	1	1.0	1.0	0	0.0	~
Acute Myeloid Leukemia	4	4.7	2.6	2	2.7	2.2
Acute Monocytic Leukemia	0	0.0	~	0	0.0	~
Chronic Myeloid Leukemia	1	1.9	1.9	0	0.0	~
Miscellaneous	11	25.4	8.9	8	11.3	4.1

~ Statistic could not be calculated.

Table 4 Total Cancer Cases and Average Annual Age-adjusted Cancer Incidence Rates (U.S. Year 1970 Standard) Rhode Island, 1998-2002, All Races, by Sex and Anatomical Site

	Males (All Races)			Females (All Races)		
SITES	Count	Rate	SE	Count	Rate	SE
All Sites	15,119	521.7	4.3	14,315	373.0	3.4
Oral Cavity and Pharynx	367	12.9	0.7	188	5.0	0.4
Lip	28	0.9	0.2	17	0.4	0.1
Tongue	103	3.6	0.4	54	1.5	0.2
Salivary Gland	29	1.0	0.2	33	0.7	0.1
Floor of Mouth	29	1.0	0.2	17	0.4	0.1
Gum and Other Mouth	46	1.6	0.2	27	0.7	0.1
Nasopharynx	19	0.7	0.2	5	0.1	0.1
Oropharynx	23	0.8	0.2	10	0.3	0.1
Hypopharynx	45	1.6	0.2	11	0.3	0.1
Digestive System	3010	101.3	1.9	2935	66.1	1.3
Esophagus	236	8.4	0.6	78	1.8	0.2
Stomach	317	10.3	0.6	239	5.0	0.4
Small Intestine	55	1.8	0.3	59	1.5	0.2
Colon and Rectum	1789	59.9	1.4	1858	41.5	1.1
Colon excluding Rectum	1237	41.1	1.2	1413	31.4	0.9
Rectum and Rectosigmoid Junction	552	18.8	0.8	445	10.2	0.5
Anus, Anal Canal and Anorectum	29	1.0	0.2	52	1.4	0.2
Liver	160	5.5	0.4	67	1.6	0.2
Intrahepatic Bile Duct	28	0.9	0.2	26	0.6	0.1
Gallbladder	26	0.8	0.2	50	1.3	0.2
Pancreas	296	10.2	0.6	373	8.3	0.5
Respiratory System	2701	93.6	1.8	2063	54.7	1.3
Larynx	201	7.2	0.5	57	1.4	0.2
Lung and Bronchus	2417	83.6	1.7	1972	52.3	1.3
Bones and Joints	17	0.7	0.2	14	0.5	0.1
Soft Tissue including Heart	106	3.6	0.4	79	2.4	0.3
Skin excluding Basal and Squamous	734	25.1	0.9	520	14.4	0.7
Melanoma of the Skin	660	22.6	0.9	462	12.9	0.6
Breast	27	0.9	0.2	4054	110.4	1.8
Female Genital System	0	0.0	~	1570	44.2	1.2
Cervix Uteri	0	0.0	~	206	6.1	0.4
Corpus and Uterus, NOS	0	0.0	~	807	22.8	0.8
Ovary	0	0.0	~	406	11.5	0.6
Male Genital System	4441	157.0	2.4	0	0.0	~
Prostate	4263	151.1	2.4	0	0.0	~
Testis	148	5.0	0.4	0	0.0	~
Penis	23	0.7	0.2	0	0.0	~
Urinary System	1794	60.7	1.5	830	21.0	0.8
Urinary Bladder	1249	41.9	1.2	482	11.8	0.6
Kidney and Renal Pelvis	508	17.5	0.8	328	8.9	0.5
Ureter	22	0.8	0.2	16	0.3	0.1
Eye and Orbit	18	0.6	0.1	19	0.6	0.1
Brain and Other Nervous System	193	6.6	0.5	176	5.2	0.4
Brain	186	6.3	0.5	163	4.8	0.4
Endocrine System	126	4.4	0.4	385	12.0	0.6
Thyroid	113	3.9	0.4	367	11.4	0.6
Lymphoma	650	22.3	0.9	633	16.5	0.7
Hodgkin Lymphoma	89	3.2	0.4	76	2.6	0.3
Non-Hodgkin Lymphoma	561	19.1	0.8	557	13.8	0.6
Myeloma	152	5.0	0.4	157	3.7	0.3
Leukemia	393	14.0	0.7	298	8.1	0.5
Acute Lymphocytic Leukemia	53	2.4	0.3	35	1.7	0.3
Chronic Lymphocytic Leukemia	120	4.2	0.4	81	1.8	0.2
Acute Myeloid Leukemia	123	4.2	0.4	96	2.5	0.3
Acute Monocytic Leukemia	6	0.2	0.1	3	0.1	0.1
Chronic Myeloid Leukemia	48	1.6	0.2	43	1.0	0.2
Miscellaneous	390	12.9	0.7	394	8.4	0.5

~ Statistic could not be calculated.

Table 5 Total Cancer Cases and Average Annual Age-adjusted Cancer Incidence Rates (U.S. Year 1970 Standard) Rhode Island, 1998-2002, Whites, by Sex and Anatomical Site

SITES	Males (Whites)			Females (Whites)		
	Count	Rate	SE	Count	Rate	SE
All Sites	14,613	542.9	4.6	13,866	393.2	3.6
Oral Cavity and Pharynx	354	13.4	0.7	177	5.1	0.4
Lip	28	0.9	0.2	17	0.4	0.1
Tongue	102	3.9	0.4	51	1.6	0.2
Salivary Gland	27	1.0	0.2	32	0.8	0.2
Floor of Mouth	25	0.9	0.2	15	0.4	0.1
Gum and Other Mouth	44	1.6	0.2	27	0.8	0.2
Nasopharynx	18	0.7	0.2	5	0.1	0.1
Oropharynx	23	0.9	0.2	9	0.3	0.1
Hypopharynx	43	1.7	0.3	9	0.3	0.1
Digestive System	2906	104.7	2.0	2845	68.6	1.4
Esophagus	230	8.8	0.6	75	1.9	0.2
Stomach	301	10.4	0.6	224	5.0	0.4
Small Intestine	52	1.9	0.3	58	1.6	0.2
Colon and Rectum	1746	62.6	1.5	1809	43.3	1.1
Colon excluding Rectum	1206	42.8	1.3	1380	32.7	1.0
Rectum and Rectosigmoid Junction	540	19.8	0.9	429	10.5	0.6
Anus, Anal Canal and Anorectum	28	1.0	0.2	51	1.4	0.2
Liver	147	5.4	0.5	64	1.7	0.2
Intrahepatic Bile Duct	26	0.9	0.2	26	0.7	0.1
Gallbladder	23	0.8	0.2	48	1.3	0.2
Pancreas	286	10.5	0.6	359	8.4	0.5
Respiratory System	2608	96.9	1.9	1995	57.0	1.4
Larynx	187	7.2	0.5	54	1.4	0.2
Lung and Bronchus	2339	86.7	1.8	1908	54.6	1.3
Bones and Joints	15	0.7	0.2	12	0.5	0.1
Soft Tissue including Heart	104	3.9	0.4	74	2.5	0.3
Skin excluding Basal and Squamous	724	27.0	1.0	515	15.8	0.7
Melanoma of the Skin	656	24.5	1.0	458	14.2	0.7
Breast	24	0.9	0.2	3922	116.2	2.0
Female Genital System	0	0.0	~	1527	47.0	1.3
Cervix Uteri	0	0.0	~	196	6.6	0.5
Corpus and Uterus, NOS	0	0.0	~	790	24.3	0.9
Ovary	0	0.0	~	392	12.1	0.7
Male Genital System	4277	162.3	2.5	0	0.0	~
Prostate	4106	155.6	2.5	0	0.0	~
Testis	144	5.7	0.5	0	0.0	~
Penis	21	0.7	0.2	0	0.0	~
Urinary System	1755	63.6	1.6	811	22.2	0.8
Urinary Bladder	1227	44.0	1.3	477	12.6	0.6
Kidney and Renal Pelvis	492	18.3	0.8	314	9.2	0.6
Ureter	21	0.8	0.2	16	0.3	0.1
Eye and Orbit	17	0.6	0.2	19	0.7	0.2
Brain and Other Nervous System	190	7.3	0.5	172	5.8	0.5
Brain	183	7.0	0.5	159	5.2	0.5
Endocrine System	120	4.8	0.5	359	12.8	0.7
Thyroid	108	4.2	0.4	342	12.1	0.7
Lymphoma	615	23.2	1.0	616	17.6	0.8
Hodgkin Lymphoma	84	3.5	0.4	71	2.9	0.4
Non-Hodgkin Lymphoma	531	19.6	0.9	545	14.7	0.7
Myeloma	145	5.1	0.4	148	3.8	0.3
Leukemia	383	15.2	0.8	291	8.9	0.6
Acute Lymphocytic Leukemia	51	3.0	0.4	33	2.0	0.4
Chronic Lymphocytic Leukemia	118	4.4	0.4	81	1.9	0.2
Acute Myeloid Leukemia	119	4.5	0.4	91	2.6	0.3
Acute Monocytic Leukemia	6	0.2	0.1	3	0.1	0.1
Chronic Myeloid Leukemia	47	1.8	0.3	43	1.2	0.2
Miscellaneous	376	13.3	0.7	383	8.7	0.5

~ Statistic could not be calculated.

Table 6 Total Cancer Cases and Average Annual Age-adjusted Cancer Incidence Rates (U.S. Year 1970 Standard) Rhode Island, 1998-2002, Blacks, by Sex and Anatomical Site

SITES	Males (Blacks)			Females (Blacks)		
	Count	Rate	SE	Count	Rate	SE
All Sites	385	551.7	29.5	322	344.8	19.7
Oral Cavity and Pharynx	10	11.8	3.9	7	7.2	2.7
Lip	0	0.0	~	0	0.0	~
Tongue	1	1.1	1.1	2	2.2	1.6
Salivary Gland	0	0.0	~	1	1.0	1.0
Floor of Mouth	4	5.1	2.7	0	0.0	~
Gum and Other Mouth	2	2.2	1.7	0	0.0	~
Nasopharynx	1	0.8	0.8	0	0.0	~
Oropharynx	0	0.0	~	0	0.0	~
Hypopharynx	1	1.1	1.1	2	2.0	1.4
Digestive System	64	97.6	12.7	67	72.3	9.0
Esophagus	5	6.4	3.0	3	3.4	2.0
Stomach	9	13.3	4.5	14	14.7	4.0
Small Intestine	2	3.6	2.5	1	1.2	1.2
Colon and Rectum	26	41.3	8.4	35	37.7	6.5
Colon excluding Rectum	19	29.8	7.1	26	27.6	5.5
Rectum and Rectosigmoid Junction	7	11.5	4.4	9	10.0	3.4
Anus, Anal Canal and Anorectum	1	0.6	0.6	0	0.0	~
Liver	5	8.0	3.6	0	0.0	~
Intrahepatic Bile Duct	1	1.6	1.6	0	0.0	~
Gallbladder	2	4.9	3.5	1	1.2	1.2
Pancreas	9	12.7	4.4	12	12.9	3.8
Respiratory System	77	113.4	13.4	61	70.6	9.1
Larynx	11	16.4	5.1	3	3.7	2.2
Lung and Bronchus	66	97.0	12.4	57	65.7	8.8
Bones and Joints	1	0.6	0.6	1	0.6	0.6
Soft Tissue including Heart	1	1.1	1.1	3	2.7	1.6
Skin excluding Basal and Squamous	6	4.1	1.7	2	2.5	1.8
Melanoma of the Skin	0	0.0	~	1	1.2	1.2
Breast	3	4.7	2.7	92	97.1	10.4
Female Genital System	0	0.0	~	28	30.0	5.8
Cervix Uteri	0	0.0	~	5	3.8	1.8
Corpus and Uterus, NOS	0	0.0	~	14	16.4	4.4
Ovary	0	0.0	~	7	7.7	3.0
Male Genital System	144	220.0	18.9	0	0.0	~
Prostate	139	214.2	18.7	0	0.0	~
Testis	2	1.6	1.1	0	0.0	~
Penis	2	3.6	2.5	0	0.0	~
Urinary System	27	34.8	7.1	15	16.3	4.3
Urinary Bladder	13	17.3	5.1	5	5.7	2.5
Kidney and Renal Pelvis	14	17.5	4.9	10	10.6	3.5
Ureter	0	0.0	~	0	0.0	~
Eye and Orbit	0	0.0	~	0	0.0	~
Brain and Other Nervous System	3	2.2	1.3	3	3.6	2.1
Brain	3	2.2	1.3	3	3.6	2.1
Endocrine System	3	1.9	1.1	15	13.0	3.5
Thyroid	3	1.9	1.1	14	11.7	3.2
Lymphoma	23	24.7	5.5	10	9.5	3.1
Hodgkin Lymphoma	4	2.9	1.5	4	3.6	1.9
Non-Hodgkin Lymphoma	19	21.7	5.3	6	5.9	2.5
Myeloma	5	8.0	3.7	7	7.9	3.0
Leukemia	7	7.5	3.1	3	2.6	1.5
Acute Lymphocytic Leukemia	1	1.6	1.6	1	0.9	0.9
Chronic Lymphocytic Leukemia	1	0.8	0.8	0	0.0	~
Acute Myeloid Leukemia	4	3.6	2.0	2	1.7	1.2
Acute Monocytic Leukemia	0	0.0	~	0	0.0	~
Chronic Myeloid Leukemia	1	1.6	1.6	0	0.0	~
Miscellaneous	11	19.0	6.0	8	8.9	3.2

~ Statistic could not be calculated.

Table 7 Total Cancer Cases and Average Annual Age-adjusted Cancer Incidence Rates (U.S. Year 2000 Standard) Rhode Island Counties, 1998-2002, All Races, by Sex and Selected Anatomical Site

	Males (All Races)			Females (All Races)		
COUNTIES / SITES	*Count*	*Rate*	*SE*	*Count*	*Rate*	*SE*
All Counties						
All Sites	15,119	628.9	5.1	14,315	444.5	3.8
Oral Cavity and Pharynx	367	15.0	0.8	188	5.9	0.4
Colon and Rectum	1,789	75.3	1.8	1,858	52.6	1.3
Lung and Bronchus	2,417	100.1	2.0	1,972	60.9	1.4
Melanoma of the Skin	660	27.3	1.1	462	15.3	0.7
Breast	27	1.2	0.2	4,054	130.6	2.1
Cervix Uteri	0	0.0	~	206	7.3	0.5
Ovary	0	0.0	~	406	13.2	0.7
Prostate	4,263	176.8	2.7	0	0.0	~
Bristol						
All Sites	842	629.5	21.9	726	428.6	16.3
Oral Cavity and Pharynx	20	15.2	3.4	11	7.3	2.2
Colon and Rectum	92	70.0	7.4	87	44.8	4.9
Lung and Bronchus	123	91.6	8.3	80	44.8	5.1
Melanoma of the Skin	45	34.8	5.2	23	14.1	3.0
Breast	3	2.1	1.2	219	138.5	9.5
Cervix Uteri	0	0.0	~	5	3.6	1.7
Ovary	0	0.0	~	22	13.2	2.9
Prostate	237	175.5	11.5	0	0.0	~
Kent						
All Sites	2,695	664.5	13.0	2,522	469.9	9.5
Oral Cavity and Pharynx	68	16.9	2.1	32	6.0	1.1
Colon and Rectum	341	85.2	4.7	318	54.8	3.1
Lung and Bronchus	459	111.4	5.2	367	66.8	3.5
Melanoma of the Skin	109	26.4	2.6	82	16.2	1.8
Breast	2	0.5	0.4	748	143.0	5.3
Cervix Uteri	0	0.0	~	38	8.1	1.3
Ovary	0	0.0	~	69	13.2	1.6
Prostate	736	180.8	6.7	0	0.0	~
Newport						
All Sites	1,273	610.5	17.3	1,232	468.5	13.5
Oral Cavity and Pharynx	41	18.9	3.0	23	8.9	1.9
Colon and Rectum	158	77.9	6.3	154	55.0	4.5
Lung and Bronchus	156	74.6	6.0	184	69.5	5.2
Melanoma of the Skin	60	27.9	3.6	47	18.5	2.7
Breast	3	1.3	0.7	356	138.4	7.4
Cervix Uteri	0	0.0	~	18	7.4	1.8
Ovary	0	0.0	~	37	14.6	2.4
Prostate	432	203.9	9.9	0	0.0	~
Providence						
All Sites	8,465	615.3	6.7	8,280	435.5	4.9
Oral Cavity and Pharynx	187	13.5	1.0	103	5.4	0.5
Colon and Rectum	995	72.9	2.3	1,103	51.9	1.6
Lung and Bronchus	1,434	104.1	2.8	1,122	59.2	1.8
Melanoma of the Skin	339	24.5	1.3	234	13.5	0.9
Breast	18	1.4	0.3	2,238	122.8	2.7
Cervix Uteri	0	0.0	~	127	7.8	0.7
Ovary	0	0.0	~	234	13.2	0.9
Prostate	2,246	163.7	3.5	0	0.0	~
Washington						
All Sites	1,844	658.4	15.5	1,555	443.2	11.3
Oral Cavity and Pharynx	51	17.5	2.5	19	5.5	1.3
Colon and Rectum	203	74.7	5.3	196	54.0	3.9
Lung and Bronchus	245	86.7	5.6	219	63.1	4.3
Melanoma of the Skin	107	37.6	3.7	76	21.9	2.5
Breast	1	0.3	0.3	493	141.7	6.4
Cervix Uteri	0	0.0	~	18	5.6	1.3
Ovary	0	0.0	~	44	12.7	1.9
Prostate	612	217.1	8.9	0	0.0	~

~ Statistic could not be calculated.

Table 8 Total Cancer Cases and Average Annual Age-adjusted Cancer Incidence Rates (U.S. Year 1970 Standard) Rhode Island Counties, 1998-2002, All Races, by Sex and Selected Anatomical Site

COUNTIES / SITES	Males (All Races)			Females (All Races)		
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All Counties						
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Oral Cavity and Pharynx	367	12.9	0.7	188	5.0	0.4
Colon and Rectum	1,789	59.9	1.4	1,858	41.5	1.1
Lung and Bronchus	2,417	83.6	1.7	1,972	52.3	1.3
Melanoma of the Skin	660	22.6	0.9	462	12.9	0.6
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Colon and Rectum	92	54.1	5.8	87	33.3	3.9
Lung and Bronchus	123	74.1	6.9	80	37.6	4.5
Melanoma of the Skin	45	29.5	4.5	23	11.7	2.6
Breast	3	1.8	1.0	219	117.6	8.4
Cervix Uteri	0	0.0	~	5	2.6	1.2
Ovary	0	0.0	~	22	11.6	2.7
Prostate	237	151.6	10.1	0	0.0	~
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All Sites	2,695	549.5	10.8	2,522	395.9	8.4
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Prostate	736	153.0	5.7	0	0.0	~
Newport						
All Sites	1,273	511.9	14.5	1,232	397.3	12.0
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Prostate	432	177.8	8.6	0	0.0	~
Providence						
All Sites	8,465	509.7	5.7	8,280	364.5	4.4
Oral Cavity and Pharynx	187	11.8	0.9	103	4.5	0.5
Colon and Rectum	995	58.1	1.9	1,103	41.0	1.4
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Breast	18	1.0	0.3	2,238	103.1	2.3
Cervix Uteri	0	0.0	~	127	6.4	0.6
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Prostate	2,246	139.3	3.0	0	0.0	~
Washington						
All Sites	1,844	548.4	12.9	1,555	372.4	9.9
Oral Cavity and Pharynx	51	13.9	2.0	19	4.6	1.1
Colon and Rectum	203	59.0	4.2	196	42.8	3.2
Lung and Bronchus	245	73.8	4.8	219	54.6	3.8
Melanoma of the Skin	107	31.9	3.1	76	18.7	2.2
Breast	1	0.4	0.4	493	119.4	5.6
Cervix Uteri	0	0.0	~	18	5.0	1.2
Ovary	0	0.0	~	44	11.5	1.8
Prostate	612	186.0	7.6	0	0.0	~

~ Statistic could not be calculated.

APPENDIX:
CANCER PREVENTION AND SCREENING RECOMMENDATIONS

Female Breast Cancer Screening

1998 Cancer Control Plan Recommendations

- For women without a family history of pre-menopausal breast cancer, CBE should be performed at the periodic health examination after the age of 30.
- Annual CBE and mammography after age 40.
- For women with a first degree relative diagnosed with pre-menopausal breast cancer, annual mammography should commence 5-10 years prior to the age at which the relative was diagnosed.
- Women with BRCA1 and BRCA2 mutations should commence monthly BSE by 20 years of age, and should receive annual or semiannual CBE, and annual mammography, beginning at age 25 to 35 years.

2002 USPSTF Recommendations

- Recommends screening mammography every 1-2 years, with or without clinical breast examination, among women aged 40 and older.
- Recommends women should be informed of potential benefits, limitations, and possible harms of mammography in making decisions about when to begin screening.
- Concludes that there is insufficient evidence to recommend for or against routine clinical breast examination alone to screen for breast cancer.
- Concludes that there is insufficient evidence to recommend for or against teaching or performing routine breast self-examination.

American Cancer Society Recommendations

- Women age 40 and older should have a screening mammogram every year, and should continue to do so for as long as they are in good health.
- Women in their 20s and 30s should have a clinical breast examination (CBE) as part of a periodic (regular) health exam by a health professional preferably every 3 years. After age 40, women should have a breast exam by a health professional every year.
- BSE is an option for women starting in their 20s. Women should be told about the benefits and limitations of BSE. Women should report any breast changes to their health professional right away.
- Women at increased risk should talk with their doctor about the benefits and limitations of starting mammograms when they are younger, having additional tests, or having more frequent exams. Women should discuss with their doctor what approaches are best for them. Although the evidence currently available does not justify recommending ultrasound or MRI for screening, women at increased risk might benefit from the results.

National Cancer Institute Recommendations (Mammography)

- Women in their 40s should be screened every one to two years with mammography.
- Women aged 50 and older should be screened every one to two years.
- Women who are at higher than average risk of breast cancer should seek expert medical advice about whether they should begin screening before age 40 and the frequency of screening.

Cervical Cancer Screening

1998 Cancer Control Plan Recommendations

- For women in high-risk groups -- women with multiple sex partners, sexually promiscuous partners, early age at first intercourse, and/or a history of a sexually transmitted disease (including human papilloma virus) -- Pap smears should be performed annually.
- For women who are HIV positive, Pap smears should be performed at least annually.
- For asymptomatic women with a cervix and no risk factors, regular Pap smears should be performed if a woman is or has been sexually active. There is no upper age limit for the performance of regular Pap smears.
- If a history of past and/or present sexual activity cannot be accurately determined and a woman is 18 years of age or over, routine Pap screening should be initiated.
- Women who have had a hysterectomy cannot be presumed to be without cervical tissue and the decision to screen them with Pap smears should be determined on a case-by-case basis.

2003 USPSTF Recommendations

- Strongly recommends screening women for cervical cancer if they are sexually active and have a cervix.
- Recommends against routinely screening women older than age 65 if they have had adequate recent screening with normal Pap smears and are not otherwise at increased risk for cervical cancer.
- Recommends against routine Pap screening for women who have had a total hysterectomy for benign disease.
- Concludes that the evidence is insufficient to recommend for or against new technologies (such as ThinPrep®) in place of conventional Pap tests.
- Concludes that the evidence is insufficient to recommend for or against human papillomavirus (HPV) testing as a primary screening test for cervical cancer.

American Cancer Society Recommendations

- All women should begin cervical cancer screening about 3 years after they begin having vaginal intercourse, but no later than when they are 21 years old. Screening should be done every year with the regular Pap test or every 2 years using the newer liquid-based Pap test.
- Beginning at age 30, women who have had 3 normal Pap test results in a row may get screened every 2 to 3 years with either the conventional (regular) or liquid-based Pap test. Women who have certain risk factors such as diethylstilbestrol (DES) exposure before birth, HIV infection, or a weakened immune system due to organ transplant, chemotherapy, or chronic steroid use should continue to be screened annually.
- Another reasonable option for women over 30 is to get screened every 3 years (but not more frequently) with either the conventional or liquid-based Pap test, *plus* the HPV DNA test.
- Women 70 years of age or older who have had 3 or more normal Pap tests in a row and no abnormal Pap test results in the last 10 years may choose to stop having cervical cancer screening. Women with a history of cervical cancer, DES exposure before birth, HIV infection or a weakened immune system should continue to have screening as long as they are in good health.
- Women who have had a total hysterectomy (removal of the uterus and cervix) may also choose to stop having cervical cancer screening, unless the surgery was done as a treatment for cervical cancer or precancer. Women who have had a hysterectomy without removal of the cervix should continue to follow the guidelines above.

National Cancer Institute Recommendations

- Cervical cancer screening should begin approximately three years after a woman begins having sexual intercourse, but no later than at 21 years old.
- Experts recommend waiting approximately three years following initiation of sexual activity because transient HPV infections and cervical cell changes that are not significant are common and it takes years for a significant abnormality or cancer to develop. Cervical cancer is extremely rare in women under the age of 25.
- Women should have a Pap test at least once every three years.
- Women 65 to 70 years of age who have had at least three normal Pap tests and no abnormal Pap tests in the last 10 years may decide, upon consultation with their healthcare provider, to stop cervical cancer screening.
- Women who have had a total hysterectomy (removal of the uterus and cervix) do not need to undergo cervical cancer screening, unless the surgery was done as a treatment for cervical precancer or cancer.
- Women should seek expert medical advice about when they should begin screening, how often they should be screened, and when they can discontinue cervical screenings, especially if they are at higher than average risk of cervical cancer due to factors such as HIV infection.

Colorectal Cancer Screening

1998 Cancer Control Plan Recommendations

- All persons should receive an annual digital rectal examination beginning at age 40.
- All persons 50 years of age and over should receive fecal occult blood testing annually and flexible sigmoidoscopy every 5 years. Persons positive by either screening test should be referred for colonoscopy.
- Persons at elevated risk for the development of colorectal cancer should be referred for diagnosis and management if there is:
    - a family history of hereditary syndromes associated with a high incidence of colon cancer (polyposis syndromes),
    - at least one first degree relative with colorectal cancer
    - a personal history of colon adenomas or colon cancer, inflammatory bowel disease involving the colon.

2002 USPSTF Recommendations

- The USPSTF strongly recommends that clinicians screen men and women aged 50 and older who are at average risk for colorectal cancer. For those at higher risk, such as those with a first-degree relative diagnosed with colorectal cancer before age 60, it is reasonable to begin screening at a younger age. Screening options for colorectal cancer include home fecal occult blood test (FOBT), flexible sigmoidoscopy, the combination of home FOBT and flexible sigmoidoscopy, colonoscopy, and double-contrast barium enema.

American Cancer Society Recommendations

- Beginning at age 50, both men and women should follow **one** of the five screening options below:
    - A fecal occult blood test (FOBT)* every year,
    - Flexible sigmoidoscopy every 5 years,
    - A fecal occult blood test every year plus flexible sigmoidoscopy every 5 years,
    - (Of these first 3 options, the combination of FOBT every year and flexible sigmoidoscopy every 5 years is preferable.)
    - Double-contrast barium enema every 5 years, or
    - Colonoscopy every 10 years.

    * For FOBT, the take-home multiple sample method should be used.

National Cancer Institute Recommendations

- None

Lung Cancer Prevention

1998 Cancer Control Plan Recommendations

- Avoid tobacco use.
- Avoid environmental tobacco smoke.

1996 USPSTF Recommendations

- Tobacco cessation counseling on a regular basis is recommended for all persons who use tobacco products.
- The prescription of nicotine patches or gum is recommended as an adjunct for selected patients.
- In addition:
    - Pregnant women and parents with children living at home should be counseled on the potentially harmful effects of smoking on fetal and child health.
    - Anti-tobacco messages are recommended for inclusion in health promotion counseling of children, adolescents, and young adults.

American Cancer Society Recommendations*

- The best way to prevent lung cancer is to not smoke and to avoid people who do. If you already smoke, you should quit. You should also avoid breathing in other people's smoke.

* Recommendations pulled from text (not explicitly stated in document).

National Cancer Institute Recommendations

- Quitting smoking is beneficial at all ages, and the earlier in life one quits, the greater the benefits.
- Nicotine dependence exposes smokers in a dose-dependent fashion to carcinogenic and genotoxic elements that cause lung cancer. Overcoming nicotine dependence is often extremely difficult. The Agency for Health Care Policy and Research released in 1996 a set of clinical smoking-cessation guidelines for helping nicotine-dependent patients and healthcare providers. The 6 major elements of these guidelines include:
    - Clinicians must document the tobacco-use status of every patient.
    - Every patient using tobacco should be offered one or more of the effective smoking cessation treatments that are available.
    - Every patient using tobacco should be provided with at least one of the effective brief cessation interventions that are available.
    - In general, more intense interventions are more effective than less intense interventions in producing long-term tobacco abstinence, reflecting the dose-response relationship between the intervention and its outcome.
    - One or more of the 3 treatment elements identified as being particularly effective should be included in smoking-cessation treatment:
        - Nicotine-replacement, e.g., nicotine patches, gum.
        - Social support from clinician in the form of encouragement, assistance.
        - Skills training/problem solving (cessation/abstinence techniques).
    - To be effective, health care systems must make institutional changes resulting in systematic identification of tobacco users and intervention with these patients at every visit.

Lung Cancer Screening

1998 Cancer Control Plan Recommendations

- None

1996 USPSTF Recommendations

- Routine screening for lung cancer with chest radiography or sputum cytology in asymptomatic persons is not recommended. All patients should be counseled against tobacco use (see Chapter 54).

American Cancer Society Recommendations

- None

National Cancer Institute Recommendations

- None

Melanoma of Skin Prevention

1998 Cancer Control Plan Recommendations

- Avoid excessive sun exposure.
- Use protective clothing whenever excessive exposure to sunlight is anticipated.
- Children, individuals who cannot avoid excessive sun exposure, and individuals who are at substantially increased risk for skin cancer should use sunscreen (at least SPF 15).
- Do not use artificial tanning devices such as commercial tanning booths and sun lamps used in the home.

1996 USPSTF Recommendations

- Counseling patients at increased risk of skin cancer to avoid excess sun exposure is recommended, based on the proven efficacy of risk reduction, although the effectiveness of counseling has not been well established. There is insufficient evidence to recommend for or against sunscreen use for the primary prevention of skin cancer.

American Cancer Society Recommendations

- The most important ways to lower your risk of melanoma are to avoid being outdoors in intense sunlight too long and to practice sun safety when you are outdoors even on cloudy or cool days. You can maintain your level of outdoor physical activity and protect your skin at the same time. Practicing sun safety includes:
    - Seeking shade – avoid being outdoors in sunlight too long
    - Protecting your skin with clothing
    - Using sunscreen – SPF of 15 or more
    - Wearing sunglasses – wrap-around sunglasses with 99% to 100% UV absorption
    - Avoiding other sources of UV light – avoid tanning beds and sun lamps
    - Protecting children from the sun
    - Identifying abnormal moles and having them removed
    - Learning more about skin cancer prevention
    - Getting genetic counseling – If several members of one side of your family have had melanoma, if you have had multiple melanomas, or if you have had melanoma at young age or have dysplastic nevi, you may have a gene mutation causing melanoma and should talk to your doctor about genetic counseling.

National Cancer Institute Recommendations

- None

Melanoma of Skin Screening

1998 Cancer Control Plan Recommendations

- Do not recommend for or against routine screening for skin cancer by primary care providers.
- Clinicians should remain alert for skin lesions with malignant features (i.e., asymmetry, border irregularity, color variability, diameter > 6mm, or rapidly changing lesions) when examining patients for other reasons, particularly patients with established risk factors, including clinical evidence of melanocytic precursor or marker lesions, large numbers of common moles, immunosuppression, a family or personal history of skin cancer, substantial cumulative lifetime sun exposure, intermittent intense sun exposure or severe sunburns in childhood, freckles, poor tanning ability, light skin, hair, and eye color.
- Recommend to consider referring patients at substantially increased risk of malignant melanoma to dermatologists specializing in skin cancer for evaluation and surveillance. Persons at substantially increased risk for malignant melanoma include those with melanocytic precursor or marker lesions, e.g., atypical moles [also called dysplastic nevi], certain congenital nevi, familial atypical mole, and melanoma syndrome.

2001 USPSTF Recommendations

- The U.S. Preventive Services Task Force (USPSTF) concludes that the evidence is insufficient to recommend for or against routine screening for skin cancer using a total-body skin examination for the early detection of cutaneous melanoma, basal cell cancer, or squamous cell skin cancer.

American Cancer Society Recommendations

- A monthly skin self-exam
- That your routine health exam include a skin examination for cancer

National Cancer Institute Recommendations

- None

Oral Cavity Cancer Screening

1998 Cancer Control Plan Recommendations

- Primary care providers should remain alert to the signs of early oral cancer, particularly leukoplakia and erythroplakia, and should refer patients with these lesions to a surgical specialist for further evaluation and treatment.

1996 USPSTF Recommendations

- There is insufficient evidence to recommend for or against routine screening of asymptomatic persons for oral cancer by primary care clinicians. All patients should be counseled to discontinue the use of all forms of tobacco (see Chapter 54) and to limit consumption of alcohol (see Chapter 52). Clinicians should remain alert to signs and symptoms of oral cancer and premalignancy in persons who use tobacco or regularly use alcohol.

American Cancer Society Recommendations

- None

National Cancer Institute Recommendations

- None

Ovarian Cancer Screening

1998 Cancer Control Plan Recommendations

- None

1996 USPSTF Recommendations

- Routine screening for ovarian cancer by ultrasound, the measurement of serum tumor markers, or pelvic examination is not recommended. There is insufficient evidence to recommend for or against the screening of asymptomatic women at increased risk of developing ovarian cancer.

American Cancer Society Recommendations

- None

National Cancer Institute Recommendations

- None

Prostate Cancer Screening

1998 Cancer Control Plan Recommendations

- Primary care providers should inform men ages 45 and over about the known risks and potential benefits of prostate cancer screening with the PSA and DRE, and make available annual screening with PSA and DRE to men ages 50 and over with at least a 10-year life expectancy and to men ages 45 and over with a high risk of developing prostate cancer (i.e., men with a family history of prostate cancer and African-American men) who, after considering information about the known risks and potential benefits of prostate cancer screening, request to be screened.

2002 USPSTF Recommendations

- The USPSTF concludes that the evidence is insufficient to recommend for or against routine screening for prostate cancer using prostate specific antigen (PSA) testing or digital rectal examination (DRE). Although the Task Force found evidence that screening can find prostate cancer early and that some cancers benefit from treatment, the Task Force is uncertain whether the potential benefits of prostate cancer screening justify the potential harms.

American Cancer Society Recommendations

- None

National Cancer Institute Recommendations

- None

Sources for Cancer Prevention and Screening Recommendations

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